NBSIR 73-241 (R)

Comparison of Photon Interaction Cross Section Data Sets. V11. Biggs– Lighthill (REV.) and ENDF/B.

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**Center for Radiation Research
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Interim Report for Period April June 1973

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U. S. DEPARTMENT OF COMMERCE, Frederick B. Dent, Secretary
NATIONAL BUREAU OF STANDARDS, Richard W. Roberts, Director

Abstract

The Biggs and Lighthill photon cross section data set (0.01 keV to > 10 GeV, Z = 1 to 100), previously compared in this report series with the ENDF/B data set (1 keV to 100 MeV, 87 elements with Z = 1 to 94), has since been revised to provide explicit coherent and incoherent scattering cross sections, rather than the more approximate free-electron (Klein-Nishina) scattering cross section. In this report we present a comparison of this revised set with the ENDF/B set, again in the form of percent differences between the two data sets. These differences for total, coherent scattering, incoherent scattering, photoelectric absorption and pair production cross sections are tabulated for 87 elements with Z = 1 - 83, 86, 90, 92 and 94 at 41 energies between 1 keV and 100 MeV. Coherent scattering differences below a few hundred keV are typically 1 - 5% and at higher energies are typically 10 - 30% for low Z and 2 - 10% for high Z. The incoherent scattering differences are generally less than 1% above 10 keV and typically 5 - 30% at 1 keV. These differences are primarily in regions of negligible scattering contribution to the total cross section, for which the differences are dominated by differences in the photoelectric absorption. The resulting differences in the total cross section are typically 1 - 5% except near 1 keV where differences are as high as 26% for Z = 68 and 69. In addition to the table of percent differences we include tables of the cross section values in barns/atom for these two sets, since they have not been generally available in this form.

I. INTRODUCTION

In a previous report (II) of this series[1] we compared a photon interaction cross section data set by Biggs and Lighthill[2,3] with the data in the ENDF/B library.[4-7] In that comparison, the Biggs and Lighthill data set consisted of parametric fits to empirical rational-function formulas for the atomic photoeffect, free-electron (Klein-Nishina) Compton scattering, and pair production cross sections. The coherent (Rayleigh) scattering cross section was not included.

Subsequent to the above comparison, to provide input to the DINT multigroup cross section preparation program[8] for photon transport calculations, Biggs and Lighthill modified their scattering cross sections to take into account electron binding. This was done by applying an additional rational-function factor with Z-dependent parameters to their Klein-Nishina rational-function approximation to give the incoherent scattering cross section including electron binding, and by also providing parameters for a rational-function approximation for the coherent scattering cross section.

As discussed in references (9) and (10) the source data for the hydrogen coherent and incoherent scattering cross sections were provided from nonrelativistic theory.[11] The coherent scattering cross section source data were calculated from the relativistic Hartree-Fock results of Cromer and Waber.[12] The incoherent scattering cross section source data for elements Z = 2 to 95 were calculated from the nonrelativistic Hartree-Fock incoherent scattering functions of Cromer and Mann[13] and Cromer.[14] For elements Z = 96 to 100 the incoherent scattering source data were calculated using Thomas-Fermi-Dirac nonrelativistic theory as described by Mendelsohn and Biggs.[15] For both the coherent and incoherent scattering source data calculations, values of the momentum transfer variable $\sin(\theta/2)/\lambda$ extending up to 80.0 $\mathring{A}^{-1}$ were included.

Also, we have been informed by Biggs that for photon energies extending above 15 MeV, where the rational-function approximation[2/] to the Klein-Nishina cross section breaks down, the full Klein-Nishina formula, without electron-binding corrections, is used instead.

As a result of these modifications, the present Biggs and Lighthill photon cross section data set now corresponds directly to the ENDF/B library, with respect to the interaction types listed, and a more meaningful comparison can be made than that presented in report II.

II. RESULTS OF THE COMPARISON

The present Biggs-Lighthill set, covering the photon energy range 10 eV* to beyond 10 GeV for elements Z =1 to 100, is in the form of Z-dependent coefficients of rational functions (polynomials or quotients of polynomials) fitted to the individual cross section types. These coefficients or parameters were supplied to us in the compact form of a card deck 1010 cards in length. Of this deck, 510 cards are occupied by photoeffect fit coefficients and absorption edge information at three to six cards per element. The coherent and incoherent scattering fit coefficients, each occupying two cards per element, account for 400 cards and the remaining 100 cards contain the pair production (pair and triplet combined) fit coefficients occupying a single card for each element.

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*In report II of this series[1/] we erroneously gave 100 eV as the lower energy limit for this set.

Using this data deck and a program containing the fitting functions given by Biggs and Lighthill in references (2), (3) and (9), it is a straightforward task to compute the photoelectric, pair production and coherent and incoherent scattering cross sections for each element at each of the 41 principal (Grodstein grid) energies (1 keV to 100 MeV) for which the corresponding values are given on the ENDF/B tape. For each element in the ENDF/B set (87 elements over the range Z = 1 to 94), the percentage deviation of the Biggs-Lighthill cross section, μ_{BL}, from the ENDF/B cross section, $\mu_{ENDF/B}$, was calculated as

$$\text{Percent Deviation} = 100 \times \left(\frac{\mu_{BL} - \mu_{ENDF/B}}{\mu_{ENDF/B}} \right) . \qquad (1)$$

The resulting sign serves to indicate that the Biggs-Lighthill cross section value is greater (+) or less (-) than the corresponding ENDF/B value. In Table I we present the results of the comparison, with the percent deviations rounded off to the nearest one-tenth percent.

In Figure 1, we have indicated the combination of energy and atomic number for which the absolute deviation of the total cross section in the Biggs-Lighthill set exceeds the ENDF/B value by at least 3%.

In addition, we also list in Tables II and III in barns/atom the Biggs-Lighthill (extended down to 10 eV) and ENDF/B cross section values, respectively, used in the above comparison, since they are not generally available in this tabular form. Values at the absorption-edge energies are omitted from Tables I - III.

The Biggs-Lighthill photoeffect and pair production cross section values remain unchanged from those in references (2) and (3) used in the comparison given in report II in this series,[1/] hence the deviations listed in Table I in the present report for photoeffect and pair production are identical with the deviations listed in report II. As was discussed in report II, the Biggs-Lighthill photoeffect and pair production source data were taken primarily from Storm and Israel.[16/] Hence these deviations are similar in sign and magnitude to those listed in report I of this series[1/] comparing the Storm and Israel set with the ENDF/B values. For low Z's Storm and Israel did not list photoeffect values at the higher energies. Here the Biggs-Lighthill deviations from ENDF/B photoeffect values are similar in sign and magnitude to those listed in report III of this series[1/] comparing NSRDS-NBS 29 values[7/] with the ENDF/B values.

In Table I the Biggs-Lighthill coherent scattering cross sections are seen to differ from values in the ENDF/B set by typically 2 - 10% for high-Z elements. For low -Z elements, particularly for energies above a few hundred keV, these deviations are typically 10 - 30% and as much as 75% for Li (Z = 3) at 100 MeV. However, in these regions of large differences the coherent scattering contribution to the total cross section is negligible.

The incoherent scattering differences, on the other hand, are largest at low energies, where the cross section is most sensitive to the atomic model used in generating the incoherent scattering function. Differences greater than 1%, except for the highest -Z elements, are confined to energies below 10 keV. The largest differences are found at 1 keV, typically 5 - 30%, and as much as 103% for Pu (Z = 94) at 1 keV. As was the case for coherent scattering, the substantial deviations between Biggs-Lighthill and ENDF/B incoherent scattering cross sections fall in regions where this interaction contributes a negligible amount to the total cross section.

The differences exceeding 3% (as much as 26% at 1 keV for Er (Z = 68) and Tm (Z = 69)) in total cross section values indicated in Fig. 1 are thus primarily differences in the photoeffect cross sections used except for the few isolated greater-than-3% differences above 5 MeV where the pair production cross section predominates.

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TABLE I

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 1 HYDROGEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-2.6	-.1	55.9	-3.1	
1.5	-.0	.5	30.0	-1.8	
2	1.7	.5	14.8	-.8	
3	.8	-.8	2.7	-.3	
4	.0	-.6	.3	-.2	
5	.5	1.0	.4	.4	
6	.7	.8	.7	1.3	
8	.2	-.7	.3	2.9	
10	.2	.1	.1	4.0	
15	.0	-1.1	.1	4.4	
20	.1	.1	.1	3.2	
30	.2	.2	.2	1.9	
40	.2	.4	.2	1.5	
50	.2	.2	.2	1.1	
60	.1	.2	.1	.6	
80	-.0	.4	-.0	-1.0	
100	.0	.7	-.0	-2.7	
150	.0	3.1	.0	-5.2	
200	.0	5.5	.1	-5.7	
300	.1	3.2	.0	-4.0	
400	.0	-3.3	.0	.7	
500	.0	-2.2	-.0	8.3	
600	-.0	-.8	-.0	18.5	
800	-.0	-.6	-.0	44.5	
1000	-.0	-1.2	-.0	76.2	
1500	-.0	-1.5	-.0	69.3	1.1
2000	.0	-1.7	-.0	76.4	2.8
3000	-.0	-1.8	-.0	75.4	.5
4000	-.1	-1.9	-.1	72.7	-2.4
5000	-.1	-1.9	-.0	73.4	-2.6
6000	.0	-2.0	-.0	72.0	2.3
8000	.1	-2.1	-.0	71.8	3.7
10000	-.0	-2.1	-.0	73.0	-.3
15000	.4	-1.3	-.0	70.2	3.7
20000	.0	.2	-.0	69.4	.3
30000	-.2	3.9	-.0	69.4	-.9
40000	-.1	8.3	-.0	70.1	-.4
50000	-.4	14.0	-.0	70.9	-1.0
60000	-.1	21.1	-.0	71.6	-.3
80000	-.2	38.2	-.0	73.1	-.4
100000	-.7	53.1	-.0	74.3	-1.2

Z= 2 HELIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-6.7	.3	-10.7	-6.7	
1.5	-2.0	.3	-5.4	-2.1	
2	-.2	.2	-1.5	-.2	
3	-.1	.5	3.1	-.3	
4	.3	1.5	2.5	-.5	
5	1.6	1.8	1.6	1.3	
6	2.1	1.6	1.0	3.8	
8	2.1	1.1	.4	8.8	
10	1.9	.9	.6	13.7	
15	.8	.4	.2	23.2	
20	.3	-.1	-.1	29.5	
30	-.0	-.4	-.1	39.3	
40	-.3	-.6	-.2	47.8	
50	-.5	-.6	-.5	54.9	
60	-.8	-1.0	-.9	60.7	
80	.1	-.8	.1	69.7	
100	.0	-.7	.0	76.5	
150	.1	-.5	.1	87.5	
200	.1	.1	.1	93.2	
300	.1	.2	.1	100.1	
400	.0	-1.4	.0	107.9	
500	.0	6.3	.0	120.1	
600	-.0	7.9	-.0	136.8	
800	-.0	12.8	-.0	178.7	
1000	-.0	26.3	-.0	226.5	
1500	-.0	25.8	-.0	219.8	1.9
2000	-.0	25.6	-.0	234.2	-.3
3000	-.0	25.3	-.0	230.9	.5
4000	-.0	25.2	-.1	223.9	.3
5000	-.0	25.1	-.0	223.3	.7
6000	.2	25.1	-.0	218.8	4.8
8000	.3	25.0	-.0	215.6	4.5
10000	-.1	24.9	-.0	215.8	-.6
15000	.2	25.0	-.0	207.8	1.3
20000	-.1	26.3	-.0	204.9	-.1
30000	.5	29.5	-.0	203.6	1.6
40000	.9	33.4	-.0	204.0	2.1
50000	.3	37.9	-.0	205.0	.6
60000	.2	43.6	-.0	206.1	.4
80000	-.1	58.0	-.0	208.3	-.1
100000	-.1	75.6	-.0	210.3	-.1

Z= 3 LITHIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	12.8	-2.3	-7.3	12.8	
1.5	4.1	-1.6	-5.1	4.2	
2	-.2	-.7	-1.8	-.2	
3	-4.7	-1.3	.0	-4.9	
4	-6.1	-2.9	.2	-6.6	
5	-5.2	-2.9	.1	-5.8	
6	-3.5	-2.5	.1	-4.2	
8	-.5	-2.3	.1	-.1	
10	.9	-2.5	.2	4.0	
15	1.3	-1.2	-.1	12.6	
20	.4	-5.2	.1	18.9	
30	.1	-5.4	.1	29.2	
40	.0	-6.0	.1	37.0	
50	.0	-6.2	.2	42.5	
60	-.1	-6.3	.0	46.4	
80	-.1	-6.6	.0	50.8	
100	-.0	-6.0	.0	53.3	
150	.1	-5.2	.1	58.0	
200	.1	-7.4	.1	61.3	
300	.1	-4.5	.1	65.5	
400	.1	-3.3	.1	68.9	
500	.0	-3.3	.0	72.8	
600	.0	.8	.0	78.6	
800	-.0	-2.0	-.0	95.2	
1000	-.0	6.2	-.0	114.0	
1500	-.0	5.8	-.0	109.2	2.4
2000	-.0	5.6	.0	118.5	-5.2
3000	-.0	5.4	-.0	117.0	-1.2
4000	-.0	5.3	-.0	112.9	1.0
5000	.1	5.2	-.0	112.9	2.5
6000	.4	5.2	-.0	110.1	6.6
8000	.5	5.1	-.0	108.2	5.6
10000	-.1	5.1	-.0	108.4	-.6
15000	-.4	4.9	-.0	103.3	-1.9
20000	-1.1	5.6	-.0	101.5	-3.7
30000	.0	7.7	-.0	100.8	.1
40000	.8	10.5	-.0	101.2	1.7
50000	.3	13.3	-.0	101.9	.5
60000	.1	17.1	-.0	102.7	.3
80000	-.5	26.2	-.0	104.2	-.8
100000	-.7	38.1	-.0	105.7	-1.0

Z= 4 BERYLLIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	5.7	-1.4	27.4	5.7	
1.5	2.8	-.4	12.3	2.8	
2	1.0	.3	4.9	.9	
3	-1.5	-1.7	-.7	-1.5	
4	-2.4	-3.1	-.9	-2.4	
5	-1.6	-2.2	-.1	-1.6	
6	-.1	-1.9	.4	-.0	
8	2.6	-2.7	.6	3.8	
10	4.1	-3.2	.3	7.5	
15	3.6	-4.6	.0	14.8	
20	2.5	-4.1	.3	19.7	
30	1.1	-3.6	.3	26.9	
40	.7	-4.2	.5	31.5	
50	.7	-4.6	.7	34.1	
60	.9	-4.8	.9	35.2	
80	-.1	-4.9	-.0	35.0	
100	-.0	-4.4	-.0	33.8	
150	.0	-4.4	.1	33.1	
200	.1	-3.8	.1	34.0	
300	.1	-3.1	.1	36.9	
400	.0	-2.8	.0	39.9	
500	.0	-6.5	.0	43.0	
600	.0	-2.5	-.1	47.3	
800	-.0	4.6	-.0	61.5	
1000	-.0	8.3	-.0	78.4	
1500	-.0	7.9	-.0	74.1	.9
2000	.0	7.7	.0	81.8	2.8
3000	-.1	7.5	.0	80.9	-2.9
4000	-.2	7.3	-.0	77.8	-4.0
5000	-.2	7.3	-.0	78.1	-3.1
6000	.1	7.2	-.0	75.8	1.4
8000	.4	7.2	.0	74.3	3.3
10000	.1	7.2	-.0	74.5	.5
15000	.8	7.0	-.0	70.4	3.3
20000	.0	7.3	-.0	69.0	.1
30000	-.4	9.2	-.0	68.5	-.8
40000	-.2	11.5	-.0	68.9	-.4
50000	-.6	14.3	-.0	69.5	-.9
60000	-.2	17.2	-.0	70.2	-.3
80000	-.3	24.9	-.0	71.6	-.4
100000	-.9	35.0	-.0	72.8	-1.1

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 5 BORON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	5.0	-.7	41.9	5.0
1.5	.3	-.3	20.6	.3
2	-1.1	-.4	9.5	-1.1
3	-.9	-2.8	2.1	-.9
4	.2	-3.7	1.2	.3
5	1.6	-2.7	-4.0	1.8
6	3.0	-2.8	-2.8	3.4
8	5.1	-3.6	-1.5	6.3
10	6.1	-3.5	.3	8.3
15	4.7	-4.3	-.0	10.7
20	3.0	-4.3	.4	11.8
30	1.3	-3.9	.3	15.1
40	.6	-4.6	.2	18.5
50	.3	-5.2	.1	21.2
60	.2	-5.6	.1	23.0
80	-.1	-5.8	-.0	24.6
100	-.0	-5.7	.0	24.1
150	-.0	-5.0	.0	21.7
200	.0	-4.7	.0	20.4
300	-.0	-3.6	.0	19.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	-3.4	.0	20.0	
500	-.0	-3.9	-.0	22.9	
600	-.0	2.8	-.0	27.6	
800	-.0	7.7	-.0	40.5	
1000	-.1	-3.4	-.1	55.1	
1500	-.0	-3.8	-.0	50.3	1.7
2000	-.0	-3.9	-.0	56.3	-4.1
3000	-.1	-4.1	-.0	54.9	-2.6
4000	-.1	-4.2	-.1	52.2	-.9
5000	.0	-4.3	-.0	52.5	.8
6000	.4	-4.3	-.0	50.5	5.0
8000	.6	-4.3	-.0	49.3	4.6
10000	-.2	-4.4	-.0	49.6	-.8
15000	-.6	-4.5	-.0	46.2	-2.0
20000	-1.7	-4.4	-.0	45.1	-4.3
30000	-.7	-2.9	-.0	44.8	-1.4
40000	.2	-1.1	-.0	45.3	.3
50000	-.3	1.1	-.0	45.9	-.4
60000	-.2	3.3	-.0	46.5	-.2
80000	-.4	9.4	-.0	47.8	-.5
100000	-.2	17.0	-.0	48.9	-.2

Z= 6 CARBON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	.2	-.5	31.6	.2
1.5	-2.4	-.6	14.9	-2.4
2	-2.5	-1.4	6.7	-2.5
3	-.7	-3.5	2.8	-.7
4	1.3	-4.0	2.5	1.4
5	3.0	-3.6	1.0	3.2
6	4.4	-4.0	.7	4.7
8	6.0	-4.6	.0	6.8
10	6.6	-4.0	1.8	7.9
15	5.2	-2.4	.5	8.2
20	3.2	-4.1	.6	8.1
30	1.8	-3.5	.4	10.3
40	1.0	-3.3	.3	12.9
50	.6	-3.1	.2	14.9
60	.3	-2.9	.1	16.2
80	.2	-2.6	.1	16.9
100	.1	-2.0	.1	15.6
150	.1	-.8	.1	11.8
200	.2	-.1	.2	9.7
300	.1	1.9	.1	8.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.1	1.7	.1	9.2	
500	.1	5.4	.1	13.0	
600	.0	3.5	.0	18.7	
800	.0	7.1	-.0	32.6	
1000	-.0	17.8	-.0	47.9	
1500	-.0	17.5	-.0	42.5	.6
2000	-.0	17.3	-.0	47.5	-1.4
3000	-.1	17.1	-.0	45.8	-2.5
4000	-.2	17.0	-.1	43.3	-1.8
5000	-.1	17.0	-.0	43.7	-.6
6000	.3	17.0	-.0	41.9	3.5
8000	.6	16.9	-.0	40.9	3.6
10000	-.2	16.9	-.0	41.2	-.9
15000	-.3	16.8	-.0	38.3	-.8
20000	-1.3	16.7	-.0	37.4	-2.9
30000	-.7	18.3	-.0	37.2	-1.2
40000	-.1	20.3	-.0	37.7	-.1
50000	-.8	22.8	-.0	38.4	-1.1
60000	-.7	25.3	-.0	39.0	-.9
80000	-.8	31.8	-.0	40.3	-1.0
100000	-.6	40.0	-.0	41.3	-.7

Z= 7 NITROGEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-1.5	-.2	14.0	-1.5
1.5	-2.4	-.7	6.4	-2.5
2	-2.7	-1.5	3.1	-2.7
3	-1.9	-3.2	2.5	-1.9
4	-.8	-3.4	1.7	-.7
5	.3	-3.5	1.2	.4
6	1.3	-4.3	.7	1.4
8	2.8	-5.1	.0	3.2
10	3.6	-4.8	.1	4.3
15	3.8	-3.0	.3	5.4
20	2.8	-4.3	.3	5.7
30	1.7	-3.7	.0	7.7
40	1.1	-2.9	.0	9.5
50	.7	-2.5	.1	10.7
60	.4	-2.2	.0	11.1
80	.1	-1.7	-.0	10.4
100	.1	-1.1	.0	8.4
150	.1	.2	.0	4.3
200	.1	1.1	.0	2.6
300	.0	2.7	.0	1.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	3.7	.0	3.7	
500	-.0	5.8	-.0	7.4	
600	-.0	6.0	-.0	12.8	
800	-.1	6.4	-.1	26.5	
1000	-.0	11.8	-.0	41.8	
1500	-.0	11.5	-.0	36.5	-1.0
2000	.0	11.3	-.0	41.4	3.5
3000	-.1	11.2	-.0	40.0	-3.5
4000	-.3	11.1	-.1	37.7	-4.9
5000	-.4	11.0	-.0	38.1	-4.2
6000	-.0	11.0	-.0	36.5	.1
8000	.3	11.0	-.0	35.7	2.0
10000	-.1	10.9	-.0	36.2	-.4
15000	.7	10.8	-.0	33.4	2.1
20000	-.5	10.8	-.0	32.6	-1.0
30000	-1.2	12.0	-.0	32.5	-2.0
40000	-.9	13.7	-.0	33.0	-1.3
50000	-1.2	15.9	-.0	33.6	-1.6
60000	-.6	18.2	-.0	34.3	-.7
80000	-.3	23.7	-.0	35.5	-.3
100000	-.6	30.7	-.0	36.6	-.7

Z= 8 OXYGEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-.4	-.1	36.6	-.3
1.5	-2.1	-.5	26.1	-2.1
2	-2.1	-1.3	19.3	-2.1
3	-.4	-2.7	13.8	-.4
4	.7	-3.0	8.9	.8
5	1.3	-3.5	8.3	1.3
6	1.8	-4.4	5.5	2.0
8	2.7	-5.3	2.4	3.0
10	3.3	-5.1	2.9	3.7
15	3.2	-4.0	1.1	4.2
20	2.5	-4.6	.6	4.3
30	1.9	-3.7	.3	5.8
40	1.4	-2.8	.2	7.0
50	.9	-2.2	.2	7.6
60	.5	-1.7	.1	7.6
80	.2	-.9	.0	6.2
100	.1	-.4	.1	3.9
150	.1	.8	.1	-.6
200	.1	1.9	.1	-3.1
300	.1	3.3	.0	-4.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	4.3	.0	-3.3	
500	.1	5.1	.0	1.3	
600	-.0	7.6	-.0	7.6	
800	-.0	9.9	-.0	21.9	
1000	-.0	14.6	-.0	37.3	
1500	-.0	14.3	-.0	31.7	-.7
2000	-.0	14.2	.0	35.9	-2.9
3000	-.1	14.0	-.0	34.3	-3.3
4000	-.2	14.0	-.1	31.9	-1.9
5000	-.1	13.9	-.0	32.3	-.5
6000	.5	13.9	-.0	30.8	3.8
8000	.8	13.8	-.0	30.2	4.1
10000	-.1	13.8	-.0	30.8	-.5
15000	-.4	13.7	-.0	28.3	-1.0
20000	-1.6	13.6	-.0	27.6	-3.4
30000	-.9	14.7	-.0	27.6	-1.4
40000	-.1	16.3	-.0	28.2	-.2
50000	-.8	18.4	-.0	28.8	-1.1
60000	-.7	20.7	-.0	29.5	-.9
80000	-.9	25.8	-.0	30.7	-1.0
100000	-.6	32.4	-.0	31.8	-.7

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 9 FLUORINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.9	-.2	18.7	1.9
1.5	-2.5	-.6	17.5	-2.5
2	-4.1	-1.3	15.5	-4.1
3	-4.2	-2.4	13.3	-4.2
4	-3.6	-2.7	8.9	-3.6
5	-3.1	-3.4	6.3	-3.1
6	-2.6	-4.2	4.5	-2.5
8	-1.4	-4.8	2.5	-1.4
10	-.6	-4.8	2.8	-.4
15	.5	-4.6	1.1	.9
20	.7	-5.5	.6	1.6
30	1.0	-5.8	.3	3.3
40	.7	-6.4	.3	4.8
50	.4	-6.8	.3	5.5
60	.1	-7.0	.2	5.6
80	-.2	-6.9	.0	4.5
100	-.2	-7.0	.1	2.3
150	-.1	-6.6	.1	-1.6
200	-.0	-6.1	.1	-3.4
300	-.0	-5.1	.0	-4.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	-4.1	.0	-2.4	
500	-.0	-3.3	-.0	1.6	
600	-.0	-2.5	-.0	7.0	
800	-.0	-.3	-.0	19.7	
1000	-.0	2.9	-.0	33.5	
1500	-.0	2.6	-.0	27.7	-.6
2000	.0	2.4	.0	31.8	-.2
3000	-.2	2.2	-.0	30.5	-3.8
4000	-.3	2.1	-.1	28.4	-3.5
5000	-.3	2.1	-.0	28.9	-2.3
6000	.3	2.0	-.0	27.6	2.2
8000	.7	2.0	-.0	27.2	3.4
10000	-.0	2.0	-.0	28.0	-.1
15000	.2	1.9	-.0	25.7	.5
20000	-1.4	1.8	-.0	25.1	-2.7
30000	-1.4	2.5	-.0	25.2	-2.1
40000	-.6	4.0	-.0	25.8	-.8
50000	-.9	5.7	-.0	26.5	-1.2
60000	-.5	7.7	-.0	27.2	-.6
80000	-.6	11.9	-.0	28.4	-.7
100000	-1.0	17.4	-.0	29.5	-1.1

Z= 10 NEON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-.0	-.2	-9.9	-.0
1.5	-.2	-.6	-4.2	-.2
2	-.6	-1.1	-.2	-.6
3	-.1	-2.0	3.9	-.0
4	1.0	-2.4	2.7	1.0
5	1.7	-3.3	1.3	1.8
6	2.4	-4.0	.5	2.5
8	3.5	-4.5	.2	3.7
10	4.1	-4.8	.5	4.5
15	4.7	-4.9	.1	5.5
20	4.1	-5.4	.1	5.8
30	3.1	-5.0	.1	6.5
40	1.8	-5.4	.1	6.8
50	.9	-5.7	.1	6.5
60	.3	-5.9	.1	5.6
80	-.2	-5.2	.0	3.1
100	-.2	-5.2	.1	.1
150	-.1	-4.8	.1	-4.5
200	-.0	-4.3	.1	-6.6
300	.0	-3.2	.1	-7.8

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	-2.4	.0	-6.9	
500	.0	-1.6	.0	-4.4	
600	-.0	-1.1	.0	-.1	
800	-.0	1.9	-.0	12.4	
1000	-.0	1.0	-.0	27.6	
1500	-.0	.7	-.0	24.9	-.3
2000	-.0	.6	.0	30.7	-3.0
3000	-.1	.4	-.0	31.0	-3.1
4000	-.2	.3	-.1	29.2	-1.5
5000	-.0	.3	-.0	29.8	-.2
6000	.6	.2	-.0	28.5	4.0
8000	.9	.2	-.0	27.9	4.0
10000	-.2	.2	-.0	28.6	-.7
15000	-.7	.1	-.0	25.9	-1.6
20000	-2.1	.0	-.0	25.0	-3.8
30000	-1.0	.6	-.0	24.9	-1.5
40000	-.1	2.0	-.0	25.4	-.1
50000	-.8	3.5	-.0	26.0	-1.0
60000	-.7	5.3	-.0	26.6	-.9
80000	-.9	9.2	-.0	27.8	-1.0
100000	-.5	14.4	-.0	28.8	-.6

Z= 11 SODIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-10.4	-1.1	-9.6	-10.4
1.5	3.0	-1.0	-4.5	2.9
2	.2	-.9	-.3	.2
3	-3.5	-1.8	1.7	-3.5
4	-5.1	-2.8	1.0	-5.1
5	-5.5	-3.6	.3	-5.6
6	-5.4	-4.0	.0	-5.5
8	-4.5	-4.4	.3	-4.6
10	-3.3	-5.2	.4	-3.3
15	-.5	-5.5	-.0	-.2
20	1.4	-4.8	.1	2.2
30	2.9	-5.3	.1	5.5
40	2.2	-7.1	.1	7.0
50	1.1	-8.5	.1	7.4
60	.3	-9.6	.1	6.8
80	-.3	-9.0	.0	4.4
100	-.5	-9.5	.1	1.7
150	-.3	-9.9	.1	-1.8
200	-.2	-9.8	.1	-3.0
300	-.0	-9.0	.1	-3.1

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.0	-8.2	.0	-2.4	
500	-.0	-7.6	.0	-1.4	
600	-.0	-7.0	.0	.9	
800	-.0	-5.6	-.0	10.1	
1000	-.0	-5.0	-.0	21.7	
1500	-.0	-5.3	-.0	19.2	.0
2000	.0	-5.5	-.0	25.1	.9
3000	-.2	-5.7	-.0	25.7	-3.3
4000	-.3	-5.7	-.1	24.1	-3.1
5000	-.3	-5.8	-.0	24.7	-2.0
6000	.4	-5.8	-.0	23.5	2.4
8000	1.0	-5.9	-.0	23.1	4.0
10000	.3	-5.9	-.0	23.8	.8
15000	.8	-5.9	-.0	21.1	1.7
20000	-.9	-6.1	-.0	20.3	-1.5
30000	-1.0	-5.6	-.0	20.1	-1.5
40000	-.4	-4.4	-.0	20.6	-.5
50000	-.8	-3.0	-.0	21.2	-1.0
60000	-.3	-1.4	-.0	21.8	-.3
80000	-.2	2.0	-.0	22.9	-.2
100000	-.6	6.6	-.0	23.9	-.6

Z= 12 MAGNESIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-.4	-1.2	7.9	-.4
1.5	4.2	-.9	2.5	4.2
2	1.3	-.6	1.3	1.3
3	-3.3	-1.6	-.1	-3.3
4	-5.4	-2.7	-.6	-5.5
5	-6.2	-3.1	-.5	-6.2
6	-6.3	-3.2	-.2	-6.3
8	-5.4	-3.4	.4	-5.4
10	-3.9	-4.1	.4	-4.0
15	-.4	-4.9	-.2	-.2
20	2.1	-4.3	.1	2.7
30	3.8	-5.6	.2	6.3
40	3.1	-8.9	.1	8.1
50	1.5	-11.7	.1	8.5
60	.3	-14.0	.1	8.1
80	-.6	-13.4	.0	5.8
100	-.8	-14.3	.1	3.3
150	-.6	-15.5	.1	-.3
200	-.4	-15.7	.0	-1.8
300	-.2	-15.5	.0	-2.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.1	-14.9	.0	-2.6	
500	-.1	-14.3	.0	-1.2	
600	-.1	-13.5	-.0	1.5	
800	-.1	-12.6	-.0	10.4	
1000	-.1	-9.9	-.0	21.1	
1500	-.0	-10.3	-.0	18.0	.4
2000	-.0	-10.4	-.0	23.2	-2.3
3000	-.2	-10.6	-.0	23.5	-2.9
4000	-.2	-10.7	-.1	21.8	-1.3
5000	-.0	-10.8	-.0	22.4	-.1
6000	.7	-10.8	-.0	21.3	4.1
8000	1.1	-10.8	-.0	21.1	4.2
10000	-.2	-10.9	-.0	21.9	-.5
15000	-.8	-10.9	-.0	19.4	-1.7
20000	-2.4	-11.0	-.0	18.7	-4.1
30000	-1.3	-10.7	-.0	18.7	-1.8
40000	-.3	-9.6	-.0	19.2	-.4
50000	-1.1	-8.3	-.0	19.8	-1.3
60000	-.9	-6.9	-.0	20.4	-1.1
80000	-1.0	-3.8	-.0	21.6	-1.1
100000	-.6	.3	-.0	22.6	-.6

TABLE I - cont. PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 13 ALUMINUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.8	-1.0	22.2	1.8	400	-.2	-17.8	.1	-8.1	
1.5	1.9	-.9	10.4	1.9	500	-.1	-17.2	.0	-5.6	
2	.4	-.9	5.0	.5	600	-.1	-16.3	.0	-1.6	
3	-1.6	-2.0	.2	-1.6	800	-.1	-15.3	-.0	10.0	
4	-3.1	-2.7	-.7	-3.1	1000	-.0	-13.4	-.0	23.9	
5	-3.8	-2.7	1.1	-3.9	1500	.0	-13.8	.0	20.4	-.2
6	-4.0	-2.8	1.0	-4.0	2000	-.0	-14.0	.0	25.7	-3.6
8	-3.5	-3.0	1.1	-3.5	3000	-.1	-14.1	.0	26.0	-2.9
10	-2.6	-3.6	-.0	-2.5	4000	-.1	-14.2	-.0	24.4	-.7
15	-.2	-5.3	-.1	-.0	5000	.1	-14.3	-.0	25.0	.6
20	1.2	-3.8	.2	1.6	6000	.9	-14.3	.0	24.0	4.7
30	1.7	-5.7	-.0	3.0	8000	1.3	-14.4	.0	23.8	4.5
40	.8	-9.6	-.0	3.5	10000	-.2	-14.4	.0	24.8	-.6
50	-.4	-13.1	.0	3.2	15000	-1.2	-14.5	-.0	22.4	-2.3
60	-1.4	-15.9	.1	2.2	20000	-2.6	-14.5	-.0	21.7	-4.4
80	-1.8	-15.4	.0	-.5	30000	-1.0	-14.3	-.0	21.7	-1.4
100	-1.7	-16.5	.1	-3.5	40000	.1	-13.3	-.0	22.3	.2
150	-1.1	-18.0	.1	-7.6	50000	-.7	-12.2	-.0	23.0	-.8
200	-.6	-18.4	.1	-9.2	60000	-.5	-10.8	-.0	23.6	-.6
300	-.3	-18.3	.1	-9.6	80000	-.7	-8.0	-.0	24.9	-.8
					100000	-.1	-4.2	-.0	25.9	-.1

Z= 14 SILICON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-4.3	-1.0	32.1	-4.3	400	-.3	-23.6	.0	-5.7	
1.5	-.8	-1.1	16.0	-.8	500	-.2	-23.2	.0	-3.6	
2	3.0	-1.3	7.8	3.0	600	-.1	-22.4	.0	.0	
3	-.5	-2.5	1.1	-.5	800	-.1	-21.5	-.0	9.6	
4	-3.1	-2.8	-.2	-3.1	1000	-.1	-20.3	-.0	20.1	
5	-4.4	-2.5	2.0	-4.5	1500	-.0	-20.8	.0	16.3	-.2
6	-5.0	-2.5	1.8	-5.0	2000	-.0	-21.0	.0	20.9	-1.1
8	-4.9	-2.9	1.4	-4.9	3000	-.2	-21.3	.0	20.6	-2.9
10	-3.9	-3.0	-.2	-4.0	4000	-.2	-21.4	-.0	19.0	-1.8
15	-1.0	-2.8	-.1	-1.0	5000	-.1	-21.5	-.0	19.6	-.7
20	1.1	-4.1	.2	1.4	6000	.7	-21.5	-.0	18.7	3.6
30	3.0	-8.0	.0	4.7	8000	1.2	-21.6	.0	18.6	4.1
40	2.6	-12.8	-.0	6.4	10000	-.1	-21.6	-.0	19.6	-.1
50	1.4	-16.3	-.0	7.1	15000	-.5	-21.7	-.0	17.4	-.9
60	.1	-18.8	-.0	6.9	20000	-2.1	-21.7	-.0	16.8	-3.5
80	-1.0	-19.8	.0	5.2	30000	-1.3	-21.6	-.0	17.0	-1.8
100	-1.4	-21.2	.1	2.7	40000	-.3	-20.7	-.0	17.6	-.3
150	-1.1	-23.0	.1	-1.5	50000	-.9	-19.7	-.0	18.3	-1.1
200	-.8	-23.6	.1	-3.8	60000	-.6	-18.6	-.0	18.9	-.7
300	-.4	-23.8	.1	-6.0	80000	-.7	-16.0	-.0	20.1	-.7
					100000	-.6	-12.8	-.0	21.2	-.7

Z= 15 PHOSPHORUS

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-8.5	-.8	33.6	-8.5	400	-.2	-18.5	.1	-5.8	
1.5	1.2	-1.0	16.6	1.2	500	-.1	-18.3	.0	-3.7	
2	-.6	-1.5	7.1	-.6	600	-.1	-17.6	.0	-.2	
3	2.1	-2.9	.0	2.1	800	-.1	-16.4	-.0	8.5	
4	-1.2	-2.9	-1.1	-1.2	1000	-.0	-14.3	-.0	18.2	
5	-3.1	-2.4	-.4	-3.1	1500	-.0	-14.8	.0	13.9	1.2
6	-4.1	-2.5	.3	-4.1	2000	-.1	-15.0	.0	18.2	-4.9
8	-4.5	-3.1	.9	-4.5	3000	-.2	-15.3	.0	17.8	-3.0
10	-3.9	-3.2	.7	-3.9	4000	-.1	-15.4	-.0	16.3	-.0
15	-1.4	-4.8	.2	-1.3	5000	.3	-15.5	-.0	17.2	1.8
20	.9	-4.0	.3	1.2	6000	1.3	-15.6	-.0	16.4	6.2
30	3.1	-7.2	.2	4.5	8000	1.9	-15.6	.0	16.5	6.1
40	3.2	-11.0	.1	6.4	10000	.2	-15.7	-.0	17.7	.6
50	2.3	-13.6	.1	7.1	15000	-1.3	-15.7	-.0	15.7	-2.5
60	1.2	-15.3	.1	7.1	20000	-3.3	-15.8	-.0	15.2	-5.3
80	-.3	-16.3	.0	5.5	30000	-1.4	-15.7	-.0	15.5	-1.9
100	-.9	-17.4	.2	3.1	40000	.2	-14.8	-.0	16.2	.3
150	-.9	-18.6	.2	-1.1	50000	-.3	-13.8	-.0	16.9	-.3
200	-.6	-18.9	.1	-3.4	60000	-.1	-12.6	-.0	17.6	-.1
300	-.3	-18.9	.1	-5.8	80000	-.4	-9.9	-.0	18.9	-.4
					100000	-.1	-6.6	-.0	19.9	-.1

Z= 16 SULFUR

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-6.0	-.6	54.8	-6.1	400	-.2	-14.9	.0	-11.7	
1.5	-.4	-1.0	27.7	-.4	500	-.2	-14.3	-.0	-8.9	
2	1.8	-1.7	14.1	1.8	600	-.1	-13.8	-.0	-4.4	
3	-.5	-3.0	4.7	-.5	800	-.0	-12.4	-.0	6.3	
4	-.8	-2.9	2.1	-.8	1000	-.0	-10.5	-.0	18.4	
5	-1.3	-2.4	1.5	-1.3	1500	.0	-11.1	.0	13.8	-.7
6	-1.5	-2.6	1.4	-1.5	2000	-.0	-11.3	.0	18.0	-1.9
8	-1.2	-3.2	1.0	-1.2	3000	-.2	-11.6	.0	17.2	-2.7
10	-.5	-3.1	-.3	-.5	4000	-.1	-11.8	-.0	15.9	-1.0
15	1.7	-2.9	-.1	1.9	5000	.0	-11.8	-.0	16.8	.2
20	3.1	-3.9	.2	3.5	6000	1.0	-11.9	.0	16.0	4.5
30	3.8	-6.6	.0	5.1	8000	1.6	-12.0	.0	16.2	4.8
40	3.0	-9.7	.0	5.5	10000	.1	-12.0	.0	17.4	.4
50	1.8	-11.6	-.0	5.0	15000	-.5	-12.1	.0	15.5	-.9
60	.5	-12.8	.0	4.1	20000	-2.1	-12.1	-.0	15.1	-3.3
80	-1.1	-13.8	-.0	1.3	30000	-.6	-12.1	-.0	15.4	-.8
100	-1.5	-14.5	.1	-1.7	40000	.8	-11.2	-.0	16.1	1.0
150	-1.3	-15.3	.1	-6.7	50000	.2	-10.2	.0	16.9	.3
200	-.9	-15.5	.0	-9.6	60000	.5	-8.9	.0	17.6	.6
300	-.4	-15.2	.0	-12.2	80000	.4	-6.2	-.0	18.9	.4
					100000	.5	-3.0	-.0	20.0	.5

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 17 CHLORINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-2.8	-.5	45.7	-2.8
1.5	-4.4	-1.0	23.2	-4.4
2	-2.7	-1.8	12.3	-2.7
3	4.1	-3.1	5.6	4.1
4	.8	-3.0	3.2	.8
5	-1.6	-2.6	2.2	-1.6
6	-3.1	-2.7	1.8	-3.2
8	-4.5	-3.1	1.0	-4.6
10	-4.7	-2.5	-.2	-4.7
15	-3.1	-2.4	-.0	-3.2
20	-1.6	-4.1	.2	-1.5
30	.5	-3.4	.1	.8
40	1.2	-4.5	.1	2.1
50	1.2	-5.1	.1	2.5
60	.7	-5.3	.1	2.4
80	-.2	-5.1	.0	1.0
100	-.6	-5.1	.1	-.9
150	-.5	-4.8	.2	-4.2
200	-.3	-4.3	.1	-6.3
300	-.1	-3.5	.1	-8.4

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.0	-2.7	.1	-8.2	
500	.0	-2.1	.0	-5.8	
600	-.0	-1.3	.0	-2.0	
800	.0	.2	-.0	7.0	
1000	.0	3.0	-.0	16.8	
1500	.0	2.5	.0	11.9	.5
2000	-.1	2.3	.0	15.8	-6.5
3000	-.2	2.0	.0	14.9	-2.6
4000	.1	1.9	-.0	13.8	1.1
5000	.5	1.8	-.0	14.9	2.8
6000	1.7	1.7	.0	14.3	7.1
8000	2.0	1.7	.0	14.7	6.1
10000	-.1	1.6	-.0	16.0	-.1
15000	-2.3	1.6	-.0	14.3	-4.1
20000	-4.1	1.5	-.0	14.0	-6.2
30000	-1.3	1.5	-.0	14.5	-1.7
40000	.4	2.5	-.0	15.2	.5
50000	-.5	3.7	-.0	16.0	-.5
60000	-.6	5.0	-.0	16.8	-.7
80000	-1.1	8.1	-.0	18.1	-1.2
100000	-.4	11.6	-.0	19.2	-.4

Z= 18 ARGON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-6.5	-.3	14.5	-6.5
1.5	-2.6	-.8	6.2	-2.6
2	-.1	-1.8	2.8	-.1
3	1.3	-3.1	2.3	1.3
4	-2.6	-3.0	1.5	-2.6
5	-3.3	-2.7	.9	-3.3
6	-3.7	-2.9	.5	-3.7
8	-3.7	-3.1	.2	-3.7
10	-3.1	-2.6	.3	-3.1
15	-.6	-2.8	.4	-.6
20	1.3	-4.2	.3	1.5
30	3.5	-3.7	.1	4.2
40	4.0	-5.1	.1	5.5
50	3.5	-5.8	.1	5.9
60	2.7	-6.2	.1	5.7
80	1.0	-6.2	.1	4.2
100	.1	-6.3	.2	2.2
150	-.4	-6.1	.2	-1.9
200	-.3	-5.7	.2	-4.7
300	-.1	-4.9	.2	-8.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.0	-4.1	.1	-8.7	
500	-.0	-3.5	.1	-6.6	
600	.0	-2.8	.0	-2.8	
800	.0	-1.1	-.0	6.0	
1000	.0	1.3	-.0	15.5	
1500	.0	.7	.0	10.8	-.4
2000	.0	.5	.0	14.7	-.5
3000	-.2	.2	.0	13.7	-2.9
4000	-.3	.0	-.1	12.6	-1.9
5000	-.2	-.0	-.0	13.8	-.9
6000	.8	-.1	-.0	13.1	3.4
8000	1.5	-.2	.0	13.5	4.2
10000	.2	-.2	-.0	14.8	.4
15000	.0	-.3	-.0	13.1	.0
20000	-1.8	-.3	-.0	12.8	-2.7
30000	-1.1	-.4	-.0	13.3	-1.5
40000	-.2	.5	-.0	14.0	-.2
50000	-.7	1.7	-.0	14.8	-.9
60000	-.4	3.0	-.0	15.6	-.4
80000	-.3	6.0	-.0	16.9	-.3
100000	-.1	9.2	-.0	18.0	-.1

Z= 19 POTASSIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-3.0	-.8	-11.0	-3.0
1.5	-3.1	-1.4	-4.1	-3.1
2	-2.6	-2.1	-.6	-2.6
3	-1.6	-2.9	1.9	-1.6
4	2.1	-2.9	1.7	2.1
5	-.2	-2.8	1.0	-.2
6	-1.9	-3.0	.4	-1.8
8	-3.4	-3.1	-.1	-3.4
10	-3.6	-3.0	.1	-3.6
15	-2.2	-4.6	.3	-2.1
20	-.4	-4.1	.3	-.3
30	1.9	-3.5	.1	2.3
40	2.9	-4.3	.1	4.0
50	3.0	-4.8	.1	4.8
60	2.6	-5.0	.1	5.0
80	1.3	-5.1	-.0	4.2
100	.4	-5.0	.2	2.7
150	-.3	-4.5	.1	-.4
200	-.3	-4.0	.1	-2.7
300	-.2	-3.1	.0	-5.5

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.1	-2.3	.0	-6.1	
500	-.0	-1.7	.0	-4.5	
600	-.0	-1.1	-.0	-1.6	
800	-.0	.7	-.0	5.2	
1000	.0	3.0	-.0	12.4	
1500	.0	2.4	.0	7.3	-.8
2000	-.0	2.1	.0	10.8	-2.0
3000	-.2	1.8	.0	9.5	-3.1
4000	-.2	1.7	-.0	8.5	-1.5
5000	-.1	1.6	-.0	9.7	-.5
6000	1.0	1.5	.0	9.1	3.8
8000	1.5	1.4	.0	9.6	4.2
10000	-.1	1.4	.0	11.0	-.1
15000	-.8	1.4	-.0	9.4	-1.4
20000	-2.7	1.3	-.0	9.2	-3.9
30000	-1.5	1.2	-.0	9.7	-1.9
40000	-.4	2.1	-.0	10.5	-.5
50000	-1.1	3.2	-.0	11.3	-1.2
60000	-.8	4.5	-.0	12.1	-.9
80000	-.7	7.4	-.0	13.4	-.8
100000	-.3	10.6	-.0	14.5	-.3

Z= 20 CALCIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-1.3	-1.3	-8.7	-1.3
1.5	-3.5	-1.4	-4.6	-3.5
2	-5.3	-1.6	-.9	-5.3
3	-5.2	-2.4	1.8	-5.2
4	-1.5	-2.8	1.7	-1.4
5	-1.5	-2.9	1.1	-1.5
6	-1.6	-2.9	.4	-1.7
8	-1.7	-2.7	-.2	-1.7
10	-1.5	-2.8	.0	-1.4
15	-.0	-2.8	.4	.0
20	.9	-3.8	.3	1.1
30	1.4	-3.2	.1	1.7
40	1.0	-3.9	.1	1.5
50	.3	-4.3	.1	.8
60	-.5	-4.5	.1	-.2
80	-1.7	-4.7	.0	-2.6
100	-2.1	-4.7	.2	-4.9
150	-1.5	-4.1	.1	-8.6
200	-1.0	-3.5	.1	-10.7
300	-.4	-2.6	.1	-12.4

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.2	-1.8	.0	-11.6	
500	-.1	-1.2	.0	-8.7	
600	-.0	-.4	.0	-4.4	
800	.0	1.0	-.0	6.4	
1000	.0	2.6	-.0	18.6	
1500	.0	2.0	.0	13.5	-.9
2000	-.1	1.7	.0	17.5	-4.3
3000	-.3	1.4	.0	16.0	-3.5
4000	-.2	1.2	-.0	15.1	-.9
5000	.1	1.2	-.0	16.4	.6
6000	1.4	1.1	-.0	15.7	5.2
8000	2.1	1.0	.0	16.1	5.6
10000	.4	1.0	-.0	17.5	.8
15000	-.9	.9	-.0	15.7	-1.6
20000	-3.1	.9	-.0	15.4	-4.5
30000	-1.5	.8	-.0	15.9	-2.0
40000	-.0	1.6	-.0	16.7	-.0
50000	-.5	2.7	-.0	17.5	-.6
60000	-.3	3.9	-.0	18.3	-.3
80000	-.4	6.8	-.0	19.7	-.5
100000	-.2	9.9	-.0	20.9	-.2

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 21 SCANDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-5.4	-1.2	-.5	-5.4
1.5	-7.6	-1.2	1.1	-7.6
2	-7.8	-1.4	3.2	-7.8
3	-5.6	-2.3	4.0	-5.6
4	-3.0	-2.8	3.2	-3.0
5	-.0	-3.0	2.2	-.0
6	-.6	-3.1	1.4	-.6
8	-2.1	-2.9	.4	-2.1
10	-3.0	-2.9	1.2	-3.0
15	-3.3	-.8	.8	-3.4
20	-2.6	-3.2	.5	-2.6
30	-.4	-2.0	.7	-.3
40	1.3	-1.7	.5	1.6
50	2.2	-1.4	.4	2.9
60	2.6	-1.2	.3	3.8
80	2.2	-.8	.1	4.2
100	1.5	-.3	.3	3.5
150	.4	.9	.2	.9
200	.1	1.8	.2	-1.5
300	.0	3.1	.1	-5.5

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	4.1	.1	-7.4	
500	.0	4.9	.1	-7.0	
600	.1	5.8	.0	-4.9	
800	.1	7.5	.0	1.5	
1000	.1	9.4	.0	8.9	
1500	.0	8.8	.0	5.6	-1.9
2000	.1	8.5	.0	10.2	.1
3000	-.3	8.2	.0	9.5	-3.7
4000	-.5	8.1	-.0	8.8	-3.0
5000	-.4	8.0	.0	10.1	-2.0
6000	.7	7.9	.0	9.4	2.5
8000	1.6	7.9	.0	9.8	4.1
10000	.5	7.8	.0	11.1	1.1
15000	.8	7.8	-.0	9.2	1.4
20000	-1.4	7.7	-.0	8.7	-2.0
30000	-1.6	7.6	-.0	9.0	-2.0
40000	-.8	8.4	-.0	9.7	-1.0
50000	-1.2	9.6	-.0	10.5	-1.4
60000	-.6	10.8	-.0	11.2	-.7
80000	-.4	13.8	-.0	12.4	-.4
100000	-.5	17.0	-.0	13.5	-.5

Z= 22 TITANIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-7.2	-1.1	6.9	-7.2
1.5	-6.0	-1.2	6.1	-6.0
2	-6.0	-1.3	6.5	-6.0
3	-5.3	-2.2	5.6	-5.3
4	-3.7	-2.8	4.2	-3.7
5	-1.2	-3.1	3.1	-1.2
6	-.2	-3.2	2.1	-.2
8	-.2	-3.1	1.0	-.2
10	-.7	-3.2	1.3	-.7
15	-1.3	-3.1	.8	-1.3
20	-1.2	-3.1	.5	-1.2
30	-.4	-2.0	.9	-.4
40	.2	-1.4	.7	.2
50	.4	-1.0	.4	.6
60	.4	-.8	.4	.6
80	-.1	-.2	.2	-.2
100	-.6	.4	.3	-1.7
150	-1.0	1.7	.1	-5.6
200	-.8	2.7	.0	-8.5
300	-.4	4.1	.0	-12.3

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.2	5.1	.0	-13.2	
500	-.1	6.0	.0	-11.4	
600	-.0	6.9	-.0	-7.7	
800	.0	8.5	-.0	1.6	
1000	.1	10.6	-.0	12.2	
1500	.0	10.0	.0	8.7	-2.4
2000	.0	9.8	.0	13.1	-1.1
3000	-.3	9.5	.0	12.3	-3.9
4000	-.5	9.3	-.1	11.5	-3.0
5000	-.4	9.2	-.0	12.7	-1.7
6000	.8	9.2	-.0	12.1	2.7
8000	1.6	9.1	.0	12.6	4.0
10000	.3	9.1	-.0	13.9	.7
15000	.4	9.0	-.0	11.9	.6
20000	-1.7	9.0	-.0	11.5	-2.4
30000	-1.2	8.8	-.0	11.8	-1.5
40000	-.0	9.6	-.0	12.5	-.0
50000	-.3	10.7	-.0	13.3	-.4
60000	.2	11.9	-.0	14.0	.3
80000	.3	14.9	-.0	15.3	.3
100000	.1	18.1	-.0	16.5	.1

Z= 23 VANADIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-6.9	-1.1	14.8	-6.9
1.5	-5.3	-1.1	11.3	-5.3
2	-5.2	-1.3	9.7	-5.2
3	-4.4	-2.1	6.8	-4.4
4	-2.9	-2.7	4.7	-2.9
5	-1.4	-3.0	3.3	-1.4
6	-3.5	-3.2	2.4	-3.4
8	-.4	-3.2	1.3	-.4
10	.7	-3.5	1.2	.8
15	1.7	-4.4	.7	1.8
20	2.1	-3.0	.5	2.2
30	2.6	-2.3	.9	2.9
40	2.6	-1.7	.6	3.1
50	2.4	-1.4	.4	2.9
60	1.9	-1.1	.3	2.5
80	.7	-.6	.2	1.1
100	-.2	-.1	.3	-.8
150	-.9	1.1	.2	-5.0
200	-.8	2.2	.1	-7.9
300	-.4	3.6	.0	-11.4

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.2	4.5	.0	-12.1	
500	-.1	5.4	.0	-10.3	
600	-.0	6.2	-.0	-6.6	
800	.0	8.0	-.0	3.1	
1000	.1	9.5	-.0	14.5	
1500	.1	9.0	.0	10.1	-1.2
2000	-.1	8.7	.0	14.4	-4.7
3000	-.3	8.4	.0	13.7	-3.2
4000	-.1	8.2	-.0	13.2	-.5
5000	.3	8.2	-.0	14.8	1.3
6000	1.6	8.1	-.0	14.4	5.4
8000	2.1	8.0	.0	15.2	5.2
10000	.0	8.0	.0	16.9	.0
15000	-1.3	7.9	-.0	15.2	-2.1
20000	-3.1	7.9	-.0	14.9	-4.3
30000	-.9	7.7	-.0	15.5	-1.1
40000	.5	8.4	-.0	16.3	.5
50000	-.4	9.5	-.0	17.2	-.4
60000	-.2	10.7	-.0	18.0	-.3
80000	-.2	13.6	-.0	19.4	-.2
100000	.9	16.6	-.0	20.6	.9

Z= 24 CHROMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-4.3	-.7	5.2	-4.3
1.5	-1.0	-.9	2.5	-1.0
2	-1.7	-1.2	1.8	-1.7
3	-3.0	-2.1	1.3	-3.0
4	-2.5	-2.7	.7	-2.5
5	-.6	-3.1	.5	-.6
6	-3.8	-3.4	.3	-3.8
8	-.4	-3.3	.1	-.4
10	.7	-3.3	.1	.7
15	1.3	-3.2	.2	1.4
20	1.5	-4.0	.4	1.6
30	1.6	-6.2	2.1	1.9
40	1.3	-7.9	1.4	1.9
50	.9	-9.2	.9	1.7
60	.4	-10.1	.8	1.4
80	-.9	-11.1	.4	.1
100	-1.7	-11.6	.5	-1.7
150	-2.2	-11.7	.3	-5.7
200	-1.8	-11.4	.1	-8.6
300	-1.0	-10.9	.1	-12.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.5	-10.4	.0	-12.4	
500	-.3	-9.9	.0	-9.9	
600	-.2	-9.3	.0	-5.5	
800	-.0	-8.0	-.0	4.9	
1000	.0	-6.4	.0	16.7	
1500	.0	-7.0	.0	11.7	-.7
2000	-.1	-7.3	.0	15.7	-6.3
3000	-.3	-7.6	.0	14.7	-3.6
4000	-.1	-7.8	-.0	14.0	-.3
5000	.5	-7.8	.0	15.6	1.9
6000	1.9	-7.9	.0	15.2	6.2
8000	2.4	-8.0	.0	16.2	5.7
10000	.1	-8.1	.0	17.9	.2
15000	-1.9	-8.1	-.0	16.2	-3.0
20000	-3.9	-8.1	-.0	16.0	-5.4
30000	-1.5	-8.3	-.0	16.6	-1.9
40000	.0	-7.7	-.0	17.4	.0
50000	-.8	-6.8	-.0	18.3	-.9
60000	-.8	-5.9	-.0	19.1	-.9
80000	-.9	-3.4	-.0	20.6	-1.0
100000	-.0	-.9	-.0	21.8	-.0

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 25 MANGANESE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-11.8	-.9	8.2	-11.8	400	-.3	3.6	-.0	-11.4	
1.5	-3.8	-1.0	3.3	-3.9	500	-.1	4.5	-.0	-9.5	
2	-3.1	-1.2	2.0	-3.2	600	-.0	5.3	-.0	-5.8	
3	-3.8	-1.9	.8	-3.8	800	.1	6.8	-.0	3.6	
4	-3.4	-2.5	.2	-3.4	1000	.1	8.5	-.0	14.4	
5	-1.6	-2.9	-.0	-1.6	1500	.1	8.0	.0	9.7	-1.2
6	1.2	-3.0	.0	1.3	2000	-.1	7.7	.0	13.6	-4.3
8	-.4	-3.0	.2	-.4	3000	-.3	7.4	.0	12.7	-3.4
10	1.4	-3.0	.2	1.4	4000	-.2	7.2	-.0	12.1	-.9
15	2.7	-2.1	.1	2.8	5000	.3	7.1	-.0	13.6	1.3
20	3.1	-2.9	.2	3.2	6000	1.7	7.1	-.0	13.3	5.6
30	3.3	-2.7	.1	3.6	8000	2.5	7.0	.0	14.2	5.8
40	3.2	-2.2	.1	3.7	10000	.6	7.0	-.0	16.0	1.1
50	2.9	-1.9	.1	3.5	15000	-.5	6.9	-.0	14.3	-.7
60	2.3	-1.7	.1	3.1	20000	-2.5	6.9	-.0	14.0	-3.5
80	1.1	-1.2	-.1	1.8	30000	-.8	6.7	-.0	14.5	-1.0
100	.0	-.8	.3	.1	40000	.6	7.3	-.0	15.3	.7
150	-1.0	.3	.0	-4.0	50000	-.1	8.4	-.0	16.2	-.1
200	-1.0	1.4	-.0	-7.0	60000	.2	9.5	-.0	17.0	.2
300	-.6	2.7	-.0	-10.7	80000	.2	12.2	-.0	18.4	.2
					100000	.7	15.1	-.0	19.6	.7

Z= 26 IRON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-6.9	-.8	15.6	-6.9	400	-.2	3.3	-.0	-6.0	
1.5	-2.6	-1.0	8.9	-2.6	500	-.0	4.1	-.0	-4.5	
2	-3.4	-1.1	6.2	-3.4	600	.0	4.9	-.0	-1.4	
3	-4.9	-1.8	3.2	-4.9	800	.1	6.4	-.0	6.2	
4	-4.7	-2.4	1.6	-4.8	1000	.1	8.2	-.0	14.6	
5	-3.4	-2.8	1.1	-3.4	1500	.1	7.6	.0	10.0	-1.8
6	-1.4	-3.0	1.0	-1.4	2000	-.0	7.3	.0	14.0	-3.0
8	-.6	-3.0	.9	-.6	3000	-.3	7.0	.0	13.2	-3.4
10	-.5	-3.2	1.2	-.5	4000	-.3	6.9	-.0	12.7	-1.6
15	-1.1	-2.9	.6	-1.0	5000	.1	6.8	-.0	14.3	.4
20	-1.2	-2.9	.6	-1.1	6000	1.5	6.8	-.0	14.0	4.5
30	-.5	-2.8	.7	-.5	8000	2.1	6.7	.0	15.0	4.8
40	.4	-2.4	.5	.5	10000	.2	6.6	.0	16.8	.3
50	1.0	-2.1	.3	1.3	15000	-.6	6.6	-.0	15.1	-1.0
60	1.4	-1.9	.3	1.9	20000	-2.7	6.5	-.0	14.8	-3.7
80	1.4	-1.4	.0	2.2	30000	-1.4	6.4	-.0	15.3	-1.8
100	1.0	-1.0	.3	1.8	40000	-.3	6.9	-.0	16.1	-.4
150	.0	.1	.1	-.1	50000	-1.0	7.9	-.0	17.0	-1.1
200	-.2	1.0	.0	-2.1	60000	-.7	9.0	-.0	17.8	-.8
300	-.2	2.3	-.0	-5.1	80000	-.7	11.7	-.0	19.2	-.8
					100000	-.3	14.5	-.0	20.4	-.3

Z= 27 COBALT

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-14.2	-.7	23.9	-14.3	400	-.2	2.8	.0	-6.9	
1.5	-3.4	-.9	14.8	-3.5	500	-.1	3.6	.0	-6.1	
2	-1.9	-1.1	10.1	-1.9	600	.0	4.4	.0	-3.8	
3	-2.5	-1.8	4.7	-2.5	800	.1	5.8	.0	2.5	
4	-3.1	-2.3	2.3	-3.1	1000	.1	7.4	-.0	9.8	
5	-2.8	-2.7	1.7	-2.8	1500	.0	6.8	.0	5.3	-1.5
6	-1.8	-2.9	1.6	-1.8	2000	-.1	6.6	.0	9.1	-4.3
8	-4.6	-2.9	1.5	-4.6	3000	-.3	6.3	.0	8.5	-3.3
10	-2.5	-2.9	1.5	-2.6	4000	-.2	6.1	-.1	7.9	-.9
15	-.9	-1.9	.7	-.9	5000	.3	6.0	-.0	9.3	1.2
20	-.1	-2.9	.6	-.1	6000	1.7	6.0	-.0	9.0	5.2
30	1.2	-2.8	.8	1.4	8000	2.1	5.9	-.0	10.0	4.9
40	2.3	-2.6	.6	2.6	10000	-.1	5.9	-.0	11.7	-.2
50	2.8	-2.3	.4	3.4	15000	-1.5	5.8	-.0	10.0	-2.3
60	3.1	-2.2	.4	3.9	20000	-3.4	5.8	-.0	9.8	-4.6
80	2.7	-1.6	.1	4.0	30000	-1.4	5.6	-.0	10.3	-1.7
100	1.9	-1.3	.3	3.3	40000	-.0	6.1	-.0	11.1	-.0
150	.3	-.4	.1	.7	50000	-.9	7.1	-.0	11.9	-1.0
200	-.2	.5	.1	-1.7	60000	-.8	8.1	-.0	12.7	-.8
300	-.4	1.8	.0	-5.4	80000	-1.0	10.7	-.0	14.1	-1.0
					100000	-.4	13.5	-.0	15.3	-.5

Z= 28 NICKEL

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-6.4	-.7	30.4	-6.3	400	-.1	1.9	.0	-3.9	
1.5	-4.6	-.8	19.4	-4.6	500	-.0	2.7	.0	-2.9	
2	-4.2	-1.0	13.0	-4.1	600	.1	3.5	.0	-.4	
3	-3.8	-1.7	5.9	-3.8	800	.1	5.0	.0	5.5	
4	-2.9	-2.2	2.9	-2.9	1000	.1	6.4	.0	11.7	
5	-1.9	-2.6	2.0	-1.8	1500	.1	5.8	.0	7.0	-2.4
6	-1.0	-2.8	1.8	-1.0	2000	.1	5.6	.0	10.8	.0
8	-.6	-2.8	1.8	-.5	3000	-.3	5.3	.0	10.2	-3.2
10	-.6	-3.0	1.4	-.6	4000	-.5	5.1	-.1	9.4	-2.6
15	-.9	-2.2	.6	-.9	5000	-.3	5.0	-.0	10.7	-1.1
20	-1.0	-2.9	.6	-1.0	6000	1.0	5.0	-.0	10.4	3.0
30	-.2	-2.9	.7	-.2	8000	1.9	4.9	.0	11.4	4.2
40	.8	-2.9	.4	1.0	10000	.5	4.9	-.0	13.2	1.0
50	1.7	-2.8	.3	2.1	15000	1.1	4.8	-.0	11.4	1.7
60	2.3	-2.7	.3	2.9	20000	-.8	4.8	-.0	11.2	-1.1
80	2.6	-2.1	.0	3.9	30000	-.7	4.6	-.0	11.7	-.8
100	2.2	-1.9	.3	3.9	40000	.1	5.1	-.0	12.6	.1
150	.8	-1.1	.1	2.5	50000	-.4	6.0	-.0	13.4	-.5
200	.2	-.3	.1	.7	60000	.1	7.0	-.0	14.2	.1
300	-.1	1.0	.0	-2.6	80000	.4	9.6	-.0	15.7	.4
					100000	.5	12.3	-.0	16.9	.6

TABLE I - cont. PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 29 COPPER

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-17.1	-.5	15.3	-17.1
1.5	-12.5	-.7	7.7	-12.5
2	-9.2	-.9	3.9	-9.2
3	-6.3	-1.5	.7	-6.3
4	-4.4	-2.1	-.3	-4.4
5	-2.8	-2.6	-.3	-2.8
6	-1.4	-2.9	.1	-1.4
8	.0	-3.0	.6	.1
10	-1.3	-3.3	.5	-1.2
15	-.4	-3.4	.1	-.4
20	-.4	-2.9	.3	-.4
30	-.2	-3.2	.2	-.1
40	.2	-3.6	.1	.3
50	.5	-3.7	.1	.8
60	.7	-3.7	.1	1.1
80	.6	-3.2	-.1	1.2
100	.2	-3.1	.3	.7
150	-.6	-2.4	.1	-1.1
200	-.8	-1.7	.0	-3.0
300	-.6	-.7	.0	-5.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.3	.4	.0	-6.6	
500	-.1	1.1	.0	-5.2	
600	-.0	1.8	-.0	-2.2	
800	.1	3.2	-.0	5.4	
1000	.1	4.7	.0	14.0	
1500	.1	4.2	.0	9.5	-2.6
2000	.1	3.9	.0	13.5	-.3
3000	-.3	3.6	.0	13.3	-3.2
4000	-.5	3.4	-.1	12.6	-2.6
5000	-.3	3.4	-.0	14.0	-1.2
6000	1.0	3.3	-.0	13.6	2.8
8000	1.6	3.2	.0	14.7	3.5
10000	-.0	3.2	-.0	16.5	-.1
15000	-.1	3.1	-.0	14.8	-.1
20000	-2.1	3.1	-.0	14.5	-2.7
30000	-1.6	2.9	-.0	15.1	-1.9
40000	-.5	3.3	-.0	16.0	-.5
50000	-.9	4.2	-.0	16.9	-1.0
60000	-.3	5.3	-.0	17.7	-.4
80000	-.2	7.7	-.0	19.2	-.2
100000	-.1	10.3	-.0	20.5	-.1

Z= 30 ZINC

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-4.7	-.6	17.3	-4.8
1.5	-7.9	-.8	7.6	-7.9
2	-3.7	-1.0	3.5	-3.7
3	-1.5	-1.5	.4	-1.5
4	-1.3	-2.0	-.5	-1.3
5	-1.4	-2.4	-.5	-1.4
6	-1.9	-2.6	-.2	-1.9
8	-3.2	-2.7	.6	-3.3
10	-3.2	-3.1	.5	-3.2
15	-2.7	-3.3	.0	-2.7
20	-2.7	-2.8	.2	-2.7
30	-1.9	-3.3	.2	-1.8
40	-.7	-4.1	.2	-.6
50	.2	-4.4	.1	.5
60	.9	-4.6	.2	1.4
80	1.4	-4.1	-.0	2.3
100	1.1	-4.2	.3	2.2
150	-.0	-3.8	.1	.7
200	-.4	-3.1	.0	-1.0
300	-.4	-2.0	.0	-3.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.3	-1.2	.1	-5.2	
500	-.1	-.4	.0	-4.8	
600	-.0	.2	.0	-2.8	
800	.1	1.5	.0	2.6	
1000	.1	2.9	.0	8.9	
1500	.1	2.3	.0	4.8	-2.1
2000	.0	2.0	.0	8.8	-.7
3000	-.3	1.8	.0	8.7	-3.0
4000	-.4	1.6	-.0	7.9	-2.0
5000	-.1	1.5	-.0	9.2	-.4
6000	1.3	1.5	-.0	8.9	3.8
8000	2.2	1.4	.0	9.8	4.7
10000	.6	1.3	-.0	11.5	1.1
15000	.5	1.3	-.0	9.7	.7
20000	-1.8	1.3	-.0	9.4	-2.3
30000	-1.5	1.1	-.0	9.8	-1.8
40000	-.4	1.5	-.0	10.7	-.5
50000	-.8	2.3	-.0	11.5	-.9
60000	-.2	3.3	-.0	12.3	-.2
80000	.2	5.6	-.0	13.7	.2
100000	.4	8.2	-.0	14.9	.5

Z= 31 GALLIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-15.2	-.6	22.5	-15.3
1.5	-13.3	-.7	10.7	-13.3
2	-9.9	-.9	5.1	-9.9
3	-7.2	-1.5	.5	-7.2
4	-5.5	-2.0	-.7	-5.5
5	-4.0	-2.3	-.6	-4.0
6	-2.7	-2.4	-.1	-2.7
8	-.8	-2.6	.8	-.8
10	-.4	-3.0	.5	-.2
15	1.2	-3.9	-.1	1.3
20	-.3	-2.7	.0	-.3
30	-.8	-3.5	.0	-.7
40	-.1	-4.9	.1	.1
50	.8	-5.9	.2	1.2
60	1.5	-6.4	.1	2.2
80	2.3	-5.9	-.0	3.6
100	2.1	-6.1	.2	4.0
150	.8	-6.1	.1	3.2
200	.1	-5.6	.2	1.7
300	-.2	-4.6	.3	-1.5

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.2	-3.8	.1	-3.5	
500	-.1	-3.2	.1	-3.6	
600	-.0	-2.5	.1	-2.6	
800	.0	-1.3	.0	.5	
1000	.1	-.0	.0	3.9	
1500	.0	-.6	.0	-.1	-2.5
2000	.0	-.8	.0	3.5	-1.0
3000	-.3	-1.1	.0	3.3	-2.7
4000	-.4	-1.3	-.1	2.6	-1.6
5000	-.0	-1.4	-.0	3.8	-.0
6000	1.4	-1.4	-.0	3.5	4.1
8000	2.2	-1.5	-.0	4.4	4.7
10000	.5	-1.5	-.0	6.1	.9
15000	.5	-1.6	-.0	4.4	.7
20000	-1.5	-1.6	-.0	4.1	-2.0
30000	-1.0	-1.8	-.0	4.6	-1.1
40000	-.1	-1.5	-.0	5.4	-.1
50000	-.8	-.6	-.0	6.2	-.9
60000	-.4	.3	-.0	7.0	-.5
80000	-.2	2.5	-.0	8.4	-.3
100000	.2	5.0	-.0	9.5	.2

Z= 32 GERMANIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-7.3	-.6	23.8	-7.3
1.5	-16.9	-.7	11.7	-16.9
2	-10.0	-.9	5.6	-10.0
3	-5.0	-1.5	1.2	-5.0
4	-3.2	-2.0	.1	-3.2
5	-2.2	-2.1	.2	-2.3
6	-1.7	-2.2	.5	-1.7
8	-1.3	-2.3	1.0	-1.3
10	-1.7	-2.5	.3	-1.6
15	1.9	-2.2	-.1	1.9
20	1.0	-2.6	.1	1.1
30	1.0	-3.5	.1	1.1
40	1.8	-5.4	.2	2.1
50	2.6	-6.8	.2	3.2
60	3.2	-7.6	.1	4.2
80	3.6	-7.0	.0	5.4
100	3.1	-7.4	.2	5.5
150	1.2	-7.6	.2	4.0
200	.2	-7.3	.3	2.0
300	-.1	-6.3	.6	-1.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.3	-5.7	.2	-3.8	
500	-.2	-5.0	.2	-3.9	
600	-.1	-4.3	.1	-2.7	
800	.1	-3.2	.1	.6	
1000	.1	-1.8	.1	4.3	
1500	-.0	-2.4	.0	-.0	-3.7
2000	.1	-2.7	.0	3.5	.3
3000	-.3	-2.9	.0	3.2	-2.7
4000	-.5	-3.1	-.1	2.3	-2.2
5000	-.3	-3.2	-.0	3.6	-.9
6000	1.1	-3.2	-.0	3.3	3.1
8000	2.0	-3.3	-.0	4.2	4.2
10000	.6	-3.3	-.0	5.9	1.0
15000	1.2	-3.4	-.0	4.2	1.7
20000	-.7	-3.4	-.0	4.0	-.9
30000	-.6	-3.6	-.0	4.5	-.7
40000	.0	-3.3	-.0	5.3	.0
50000	-.7	-2.5	-.0	6.1	-.7
60000	-.2	-1.6	-.0	6.9	-.2
80000	-.0	.5	-.0	8.3	-.0
100000	.1	3.0	-.0	9.5	.1

TABLE I - cont. PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 33 ARSENIC

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-22.7	-.5	23.6	-22.7
1.5	-9.7	-.7	11.1	-9.7
2	-6.8	-1.0	4.6	-6.8
3	-5.0	-1.6	-.2	-5.1
4	-4.7	-1.9	-.9	-4.8
5	-4.4	-2.0	-.5	-4.4
6	-4.0	-2.1	.1	-4.0
8	-2.9	-2.4	.8	-2.9
10	-1.8	-2.8	.8	-1.8
15	1.4	-4.4	.2	1.4
20	-.2	-2.5	.1	-.2
30	-.8	-3.4	.1	-.7
40	-.1	-5.6	.2	.2
50	.9	-7.2	.2	1.4
60	1.8	-8.3	.1	2.6
80	2.9	-7.6	-.1	4.4
100	2.9	-8.1	.2	5.2
150	1.5	-8.5	.1	4.9
200	.4	-8.2	.2	3.4
300	-.3	-7.5	.1	-.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.3	-6.8	.1	-2.5	
500	-.2	-6.1	.1	-2.7	
600	-.1	-5.3	.1	-1.7	
800	.0	-4.4	.1	.7	
1000	.1	-3.0	.0	3.1	
1500	-.0	-3.6	.0	-1.1	-3.6
2000	.0	-3.8	.0	2.3	.1
3000	-.4	-4.1	.0	2.0	-3.0
4000	-.6	-4.3	-.1	1.2	-2.5
5000	-.4	-4.3	-.0	2.5	-1.2
6000	1.1	-4.4	-.0	2.2	2.9
8000	1.9	-4.5	-.0	3.1	3.9
10000	.3	-4.5	-.0	4.8	.6
15000	.5	-4.6	-.0	3.2	.7
20000	-1.8	-4.6	-.0	2.9	-2.3
30000	-1.8	-4.7	-.0	3.5	-2.1
40000	-.9	-4.5	-.0	4.3	-1.0
50000	-1.3	-3.7	-.0	5.1	-1.4
60000	-.7	-2.8	-.0	5.9	-.7
80000	-.4	-.8	-.0	7.3	-.4
100000	-.3	1.6	-.0	8.5	-.3

Z= 34 SELENIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-6.1	-.4	40.2	-6.1
1.5	-10.2	-.7	19.9	-10.2
2	-7.6	-1.0	9.9	-7.7
3	-6.6	-1.7	2.8	-6.6
4	-6.9	-1.8	.8	-6.9
5	-6.9	-1.8	.5	-7.0
6	-6.6	-2.0	.7	-6.7
8	-5.3	-2.3	1.1	-5.4
10	-3.7	-2.4	.1	-3.7
15	2.6	-2.8	-.2	2.6
20	-1.0	-2.5	-.1	-.9
30	-3.6	-3.2	-.1	-3.6
40	-3.8	-5.5	.1	-3.8
50	-3.3	-7.3	.1	-3.2
60	-2.6	-8.5	.1	-2.3
80	-1.4	-7.7	-.1	-.9
100	-1.0	-8.2	.2	-.4
150	-1.2	-8.7	.1	-.8
200	-1.2	-8.5	.2	-1.9
300	-.7	-7.8	.6	-4.4

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.6	-6.9	.1	-5.6	
500	-.3	-6.3	.1	-4.8	
600	-.2	-5.6	.1	-2.9	
800	-.0	-4.7	.0	1.1	
1000	.1	-3.3	.0	5.0	
1500	-.0	-3.9	.0	.8	-3.0
2000	-.1	-4.1	.0	4.2	-2.4
3000	-.3	-4.4	.0	3.9	-2.2
4000	-.1	-4.6	-.1	3.0	-.3
5000	.4	-4.6	-.0	4.2	1.4
6000	2.0	-4.7	-.0	3.9	5.3
8000	2.6	-4.8	-.0	4.8	5.3
10000	.4	-4.8	-.0	6.5	.7
15000	-.4	-4.9	-.0	4.8	-.5
20000	-2.0	-4.9	-.0	4.5	-2.5
30000	-.3	-5.0	-.0	5.0	-.3
40000	.8	-4.9	-.0	5.8	.9
50000	-.1	-4.1	-.0	6.7	-.1
60000	.1	-3.2	-.0	7.5	.1
80000	.1	-1.2	-.0	8.9	.1
100000	.9	1.2	-.0	10.1	.9

Z= 35 BROMINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-3.8	-.4	38.4	-3.8
1.5	-.2	-.7	18.9	-.2
2	-5.9	-1.1	9.6	-5.9
3	-4.3	-1.8	3.4	-4.3
4	-4.6	-1.8	1.3	-4.6
5	-4.7	-1.7	.9	-4.7
6	-4.5	-1.9	.9	-4.6
8	-3.7	-2.3	1.1	-3.6
10	-2.4	-2.4	.1	-2.4
15	3.0	-2.7	-.1	3.1
20	.1	-2.4	-.2	.2
30	-2.1	-2.9	-.1	-2.1
40	-2.3	-5.1	.1	-2.2
50	-1.7	-6.9	.1	-1.5
60	-1.0	-8.2	.1	-.7
80	.0	-7.3	-.1	.7
100	.3	-7.8	.2	1.2
150	-.4	-8.2	.1	.6
200	-.8	-8.0	.2	-.8
300	-.7	-7.3	.5	-3.6

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.6	-6.5	.1	-5.0	
500	-.3	-5.8	.1	-4.4	
600	-.2	-5.1	.1	-2.6	
800	.0	-4.1	.1	1.2	
1000	.1	-2.8	.0	4.7	
1500	-.0	-3.4	.0	.5	-4.1
2000	.2	-3.6	.0	3.9	3.8
3000	-.3	-3.9	.0	3.5	-2.2
4000	-.8	-4.1	-.1	2.6	-3.2
5000	-.8	-4.1	-.0	3.9	-2.4
6000	.6	-4.2	-.0	3.5	1.6
8000	1.7	-4.3	-.0	4.5	3.4
10000	.8	-4.3	-.0	6.2	1.3
15000	2.5	-4.4	-.0	4.5	3.5
20000	.3	-4.4	-.0	4.2	.4
30000	-.9	-4.6	-.0	4.7	-1.0
40000	-.4	-4.4	-.0	5.6	-.4
50000	-.7	-3.6	-.0	6.4	-.8
60000	.2	-2.7	-.0	7.2	.2
80000	.6	-.8	-.0	8.7	.7
100000	.3	1.6	-.0	9.9	.3

Z= 36 KRYPTON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-2.8	-.3	17.8	-2.8
1.5	-1.8	-.7	7.6	-1.8
2	-7.3	-1.2	3.2	-7.3
3	-3.6	-1.8	1.2	-3.7
4	-3.8	-1.7	.4	-3.9
5	-4.4	-1.7	.2	-4.4
6	-4.8	-1.9	.3	-4.8
8	-4.7	-2.4	.7	-4.7
10	-3.7	-2.3	.7	-3.8
15	1.5	-2.3	.3	1.5
20	.1	-2.3	.1	.1
30	-1.0	-3.2	.1	-.9
40	-.8	-5.7	.2	-.5
50	-.1	-7.7	.2	.2
60	.5	-9.1	.2	1.1
80	1.4	-8.4	-.0	2.5
100	1.5	-8.9	.3	3.0
150	.4	-9.5	.2	2.3
200	-.4	-9.3	.2	.7
300	-.8	-8.7	.3	-2.6

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.6	-8.0	.2	-4.3	
500	-.4	-7.3	.1	-4.0	
600	-.1	-6.6	.1	-2.5	
800	.0	-5.7	.1	.8	
1000	.1	-4.4	.1	3.8	
1500	-.0	-5.0	.0	-.6	-4.1
2000	.1	-5.3	.0	2.7	.5
3000	-.3	-5.6	.0	2.2	-2.2
4000	-.5	-5.7	-.1	1.3	-1.7
5000	-.2	-5.8	-.0	2.5	-.7
6000	1.2	-5.9	-.0	2.2	3.2
8000	2.0	-5.9	-.0	3.2	3.9
10000	.3	-6.0	-.0	4.9	.5
15000	.5	-6.0	-.0	3.2	.7
20000	-1.4	-6.1	-.0	2.9	-1.8
30000	-1.0	-6.2	-.0	3.4	-1.2
40000	-.2	-6.1	-.0	4.3	-.2
50000	-.8	-5.3	-.0	5.1	-.9
60000	-.3	-4.5	-.0	6.0	-.4
80000	-.0	-2.6	-.0	7.4	-.0
100000	.4	-.3	-.0	8.6	.4

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 37 RUBIDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-2.5	-.6	-3.2	-2.5	400	-.5	-6.1	.1	-3.2	
1.5	1.0	-.9	.5	1.0	500	-.3	-5.2	.1	-3.0	
2	-6.5	-1.3	1.1	-6.5	600	-.1	-4.5	.1	-1.8	
3	-4.1	-1.9	.9	-4.0	800	.0	-3.7	.1	.9	
4	-4.0	-1.7	.3	-4.0	1000	.1	-2.5	.0	3.2	
5	-4.5	-1.6	-.0	-4.5	1500	-.0	-3.0	.0	-1.1	-4.0
6	-4.8	-1.8	.0	-4.8	2000	-.0	-3.3	.0	2.1	-1.3
8	-4.7	-2.4	.4	-4.8	3000	-.4	-3.6	-.0	1.6	-2.5
10	-3.7	-2.4	.7	-3.8	4000	-.4	-3.7	-.1	.7	-1.2
15	1.0	-1.8	.2	1.2	5000	.0	-3.8	-.0	1.9	.2
20	1.6	-2.3	-.0	1.7	6000	1.7	-3.9	-.0	1.6	4.2
30	-.7	-2.4	-.0	-.7	8000	2.4	-4.0	-.0	2.5	4.8
40	-1.2	-4.7	.1	-1.0	10000	.5	-4.0	-.0	4.2	.9
50	-.8	-6.7	.1	-.6	15000	-.1	-4.0	-.1	2.4	-.1
60	-.4	-8.1	.1	.1	20000	-2.3	-4.1	-.1	2.1	-2.9
80	.6	-6.9	-.1	1.3	30000	-1.6	-4.2	-.1	2.5	-1.8
100	.9	-7.3	.2	1.9	40000	-.5	-4.1	-.1	3.4	-.5
150	.4	-7.8	.1	1.9	50000	-1.1	-3.4	-.1	4.2	-1.2
200	-.2	-7.6	.1	.9	60000	-.6	-2.5	-.1	5.0	-.7
300	-.6	-6.8	.1	-1.7	80000	-.4	-.6	-.1	6.4	-.5
					100000	-.1	1.7	-.1	7.7	-.1

Z= 38 STRONTIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	.8	-.9	-4.9	.8	400	-.8	-4.3	.2	-5.9	
1.5	-2.6	-1.0	-1.5	-2.6	500	-.4	-3.5	.1	-4.8	
2	-3.5	-1.2	.5	-3.5	600	-.1	-2.7	.1	-2.6	
3	-4.0	-1.7	.9	-4.0	800	.1	-1.9	.1	1.9	
4	-4.6	-1.7	.5	-4.6	1000	.2	-.6	.1	6.1	
5	-4.8	-1.7	.1	-4.9	1500	-.0	-1.2	.0	1.5	-4.2
6	-4.7	-1.8	-.0	-4.7	2000	.1	-1.5	.0	4.6	-.0
8	-3.4	-2.2	.2	-3.4	3000	-.3	-1.8	-.0	4.0	-2.3
10	-1.5	-2.4	.5	-1.5	4000	-.4	-1.9	-.1	3.0	-1.6
15	3.8	-1.5	.3	4.1	5000	-.1	-2.0	-.0	4.1	-.4
20	3.0	-2.3	.1	3.1	6000	1.4	-2.1	-.0	3.8	3.6
30	1.1	-2.2	-.1	1.2	8000	2.3	-2.2	-.0	4.7	4.4
40	.3	-4.1	.1	.5	10000	.6	-2.2	-.0	6.5	1.0
50	.0	-5.8	.1	.3	15000	.7	-2.3	-.1	4.6	1.0
60	-.0	-6.9	.1	.4	20000	-1.3	-2.3	-.0	4.3	-1.6
80	.1	-5.7	-.1	.6	30000	-.7	-2.4	-.1	4.8	-.8
100	.1	-6.0	.2	.6	40000	.3	-2.3	-.1	5.7	.3
150	-.7	-6.3	.2	-.4	50000	-.3	-1.6	-.1	6.6	-.3
200	-1.2	-5.9	.2	-2.0	60000	.3	-.8	-.1	7.4	.3
300	-1.2	-5.1	.2	-4.8	80000	.4	1.2	-.1	8.9	.4
					100000	.5	3.5	-.1	10.1	.5

Z= 39 YTTRIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-2.7	-.9	.8	-2.7	400	-.5	-4.2	.2	-3.7	
1.5	.2	-1.1	2.9	.2	500	-.2	-3.5	.2	-3.2	
2	-.2	-1.2	3.9	-.1	600	-.1	-2.8	.1	-1.8	
3	-4.5	-1.7	3.5	-4.5	800	.2	-1.8	.1	1.3	
4	-3.4	-1.9	2.6	-3.4	1000	.1	-.6	.1	4.2	
5	-3.6	-1.8	1.7	-3.6	1500	-.0	-1.2	.0	-.2	-4.6
6	-3.9	-1.8	1.1	-3.9	2000	.2	-1.5	.0	3.0	4.0
8	-4.2	-2.2	-2.4	-4.2	3000	-.2	-1.8	-.0	2.4	-1.7
10	-3.8	-2.3	.9	-3.9	4000	-.7	-1.9	-.1	1.4	-2.5
15	-1.5	-1.0	.5	-1.6	5000	-.7	-2.0	-.0	2.6	-1.9
20	-.0	-2.4	.2	.0	6000	.8	-2.1	-.0	2.2	2.0
30	-.9	-2.2	.0	-.8	8000	2.0	-2.1	-.0	3.1	3.9
40	-1.0	-4.2	.2	-.9	10000	1.1	-2.2	-.0	4.8	1.8
50	-.8	-5.8	.2	-.7	15000	2.7	-2.2	-.1	2.9	3.7
60	-.5	-6.8	.1	-.2	20000	.4	-2.3	-.1	2.5	.5
80	.2	-5.7	-.1	.6	30000	-.9	-2.4	-.1	3.0	-1.0
100	.5	-6.0	.2	1.2	40000	-.4	-2.3	-.1	3.8	-.4
150	.2	-6.2	.2	1.2	50000	-.7	-1.6	-.1	4.7	-.8
200	-.4	-5.9	.2	.2	60000	.1	-.8	-.1	5.5	.2
300	-.9	-5.0	.0	-2.4	80000	.6	1.1	-.1	7.0	.6
					100000	.2	3.4	-.1	8.2	.2

Z= 40 ZIRCONIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-4.6	-.9	7.7	-4.6	400	-.1	-4.2	.1	-.0	
1.5	-.9	-1.1	7.3	-.9	500	.0	-3.5	.1	.5	
2	-.9	-1.2	6.7	-.9	600	.1	-2.6	.1	1.8	
3	-6.0	-1.7	4.8	-6.0	800	.2	-1.8	.0	4.3	
4	-4.7	-1.9	3.4	-4.7	1000	.2	-.6	.0	6.2	
5	-4.5	-1.8	2.3	-4.5	1500	.0	-1.2	.0	1.7	-3.7
6	-4.4	-1.8	1.6	-4.5	2000	.0	-1.5	.0	4.9	-1.2
8	-4.0	-2.1	-3.8	-4.0	3000	-.3	-1.8	-.0	4.3	-2.1
10	-3.0	-2.3	1.2	-3.0	4000	-.2	-1.9	-.1	3.3	-.6
15	.1	-1.1	.5	.2	5000	.3	-2.0	-.0	4.4	.8
20	2.2	-2.4	.1	2.3	6000	2.0	-2.1	-.0	4.0	4.9
30	-.6	-2.2	-.0	-.6	8000	2.9	-2.2	-.0	4.9	5.5
40	-1.4	-4.2	.1	-1.3	10000	1.0	-2.2	-.0	6.6	1.6
50	-1.3	-5.8	.1	-1.1	15000	.4	-2.3	-.1	4.7	.5
60	-.8	-6.8	.1	-.6	20000	-1.7	-2.3	-.1	4.3	-2.2
80	.4	-5.7	-.2	.9	30000	-.8	-2.5	-.1	4.8	-.9
100	1.3	-6.0	.3	2.1	40000	.6	-2.4	-.1	5.6	.6
150	1.5	-6.2	.1	3.3	50000	.0	-1.7	-.1	6.5	.1
200	.9	-5.9	.1	3.0	60000	.5	-.9	-.1	7.3	.6
300	-.2	-5.0	-.1	1.1	80000	.7	1.0	-.1	8.8	.7
					100000	1.0	3.3	-.1	10.1	1.0

TABLE I - cont. PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 41 NIOBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-1.9	-.7	1.0	-1.9
1.5	-.8	-1.0	.3	-.8
2	-.8	-1.2	.4	-.8
3	-3.7	-1.8	.7	-3.7
4	-3.7	-2.0	.8	-3.7
5	-4.4	-1.9	.6	-4.4
6	-4.9	-1.9	.4	-4.9
8	-4.9	-2.1	-5.0	-4.9
10	-3.9	-2.2	.9	-3.9
15	.7	-1.0	.4	.8
20	.7	-2.4	-.0	.8
30	-1.4	-2.3	-.1	-1.4
40	-2.3	-4.5	.1	-2.2
50	-2.4	-6.1	.2	-2.3
60	-2.2	-7.2	.1	-2.1
80	-1.6	-6.3	-.1	-1.3
100	-1.1	-6.6	.2	-.8
150	-1.0	-6.9	.1	-.7
200	-1.2	-6.6	.1	-1.6
300	-1.4	-5.8	-.2	-3.4

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.7	-4.9	.1	-3.8	
500	-.3	-4.3	.1	-2.5	
600	-.1	-3.5	.0	-.1	
800	.2	-2.6	.1	4.9	
1000	.3	-1.4	.0	9.4	
1500	.1	-2.0	.0	5.3	-2.5
2000	-.0	-2.3	.0	8.6	-2.4
3000	-.3	-2.6	-.0	8.1	-2.2
4000	-.1	-2.8	-.1	6.9	-.0
5000	.6	-2.9	-.1	8.1	1.7
6000	2.5	-2.9	-.0	7.6	5.9
8000	3.4	-3.0	-.0	8.3	6.3
10000	1.2	-3.1	-.0	10.1	2.0
15000	-.1	-3.1	-.1	7.9	-.2
20000	-2.5	-3.2	-.1	7.4	-3.1
30000	-1.2	-3.3	-.1	7.8	-1.4
40000	.4	-3.2	-.1	8.6	.4
50000	-.1	-2.6	-.1	9.5	-.1
60000	.3	-1.7	-.1	10.4	.3
80000	.2	.1	-.1	11.9	.2
100000	.3	2.3	-.1	13.2	.3

Z= 42 MOLYBDENUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-8.0	-.6	6.0	-8.0
1.5	-1.7	-.9	2.7	-1.7
2	-.5	-1.2	1.5	-.5
3	-5.3	-1.8	.9	-5.3
4	-3.8	-1.9	.7	-3.8
5	-3.9	-1.9	.5	-3.9
6	-4.1	-2.0	.3	-4.1
8	-4.1	-2.1	-4.8	-4.1
10	-3.5	-2.2	-2.1	-3.5
15	-.1	-1.7	-.8	-.0
20	1.1	-1.2	-.6	1.1
30	-.8	-2.4	-.3	-.8
40	-2.0	-4.9	-.0	-1.9
50	-2.6	-6.9	.1	-2.5
60	-2.9	-8.1	.0	-2.7
80	-2.9	-7.3	-.2	-2.9
100	-3.0	-7.7	.2	-3.0
150	-3.3	-8.1	.1	-4.0
200	-3.3	-7.9	.1	-5.4
300	-2.6	-7.2	.1	-7.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-1.6	-6.4	.1	-8.5	
500	-1.0	-5.9	.1	-7.4	
600	-.5	-5.1	.1	-5.3	
800	-.0	-4.0	.1	-.1	
1000	.2	-3.0	.1	5.3	
1500	-.0	-3.6	.0	1.2	-3.6
2000	.2	-3.9	.0	4.4	2.4
3000	-.3	-4.2	-.0	4.0	-1.9
4000	-.6	-4.4	-.1	3.1	-2.2
5000	-.5	-4.4	-.1	4.3	-1.5
6000	1.0	-4.5	-.1	3.9	2.5
8000	2.1	-4.6	-.0	4.7	3.9
10000	.9	-4.6	-.1	6.5	1.4
15000	2.0	-4.7	-.1	4.5	2.7
20000	.1	-4.7	-.1	4.1	.1
30000	-.3	-4.9	-.1	4.5	-.3
40000	.4	-4.8	-.1	5.3	.5
50000	-.0	-4.2	-.1	6.2	-.0
60000	.7	-3.4	-.1	7.0	.7
80000	1.1	-1.6	-.1	8.5	1.1
100000	1.0	.5	-.1	9.8	1.1

Z= 43 TECHNETIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-8.5	-.7	8.7	-8.5
1.5	-2.3	-.8	3.9	-2.3
2	-1.0	-1.1	2.1	-1.0
3	-3.2	-1.7	.4	-3.2
4	-5.0	-1.9	.0	-5.0
5	-4.4	-1.9	.0	-4.4
6	-4.2	-2.0	.1	-4.3
8	-3.9	-2.0	.3	-3.9
10	-3.2	-2.1	.5	-3.2
15	-.5	-1.7	.3	-.4
20	2.3	-2.4	-.0	2.8
30	-.2	-2.2	-.1	-.2
40	-1.3	-4.1	.1	-1.2
50	-1.6	-5.5	.1	-1.5
60	-1.5	-6.3	.1	-1.3
80	-.9	-5.5	-.1	-.6
100	-.3	-5.8	.3	.1
150	.1	-5.9	.1	.7
200	-.3	-5.5	.2	.1
300	-.7	-4.6	.2	-1.8

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.5	-3.8	.1	-2.9	
500	-.3	-3.2	.2	-2.5	
600	-.0	-2.4	.1	-1.2	
800	.1	-1.5	.1	1.0	
1000	.1	-.2	.1	2.8	
1500	-.0	-.9	.0	-1.4	-3.0
2000	.0	-1.2	.0	1.6	-.6
3000	-.3	-1.5	-.0	.9	-2.1
4000	-.3	-1.7	-.1	-.1	-.8
5000	.1	-1.8	-.1	1.0	.5
6000	1.9	-1.9	-.1	.6	4.5
8000	2.9	-1.9	-.0	1.5	5.3
10000	1.0	-2.0	-.1	3.3	1.6
15000	.5	-2.1	-.1	1.3	.8
20000	-1.6	-2.1	-.1	1.0	-1.9
30000	-.8	-2.2	-.1	1.4	-.8
40000	.5	-2.2	-.1	2.3	.5
50000	-.1	-1.6	-.1	3.1	-.1
60000	.4	-.8	-.1	4.0	.5
80000	.6	1.0	-.1	5.5	.6
100000	.8	3.2	-.1	6.7	.8

Z= 44 RUTHENIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-7.0	-.5	12.3	-7.0
1.5	-1.6	-.7	4.6	-1.6
2	-1.8	-1.1	.3	-1.9
3	-4.0	-1.7	-.8	-4.0
4	-4.2	-1.9	-.3	-4.2
5	-3.7	-2.0	.1	-3.7
6	-3.8	-2.1	.4	-3.8
8	-4.0	-2.1	1.7	-4.0
10	-3.7	-2.2	1.5	-3.8
15	-1.3	-2.2	.8	-1.3
20	2.2	-2.4	.4	2.5
30	-.0	-2.1	.2	.0
40	-1.0	-3.7	.3	-.9
50	-1.3	-4.6	.3	-1.1
60	-1.2	-5.1	.2	-1.0
80	-.6	-4.5	-.1	-.4
100	-.1	-4.7	.3	.1
150	.2	-4.5	.2	.7
200	-.1	-4.0	.2	.2
300	-.6	-3.0	.1	-1.5

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.5	-2.2	.2	-2.8	
500	-.3	-1.7	.1	-2.9	
600	-.2	-.9	.1	-2.1	
800	.0	.2	-.0	-.4	
1000	.1	1.5	.1	1.2	
1500	-.1	.8	.0	-2.5	-2.5
2000	.0	.5	.0	.9	.2
3000	-.3	.1	-.0	.3	-1.9
4000	-.3	-.1	-.1	-.5	-.9
5000	.1	-.2	-.1	.7	.3
6000	1.9	-.2	-.1	.4	4.3
8000	2.9	-.3	-.1	1.3	5.3
10000	1.1	-.4	-.1	3.0	1.8
15000	.5	-.5	-.1	1.0	.7
20000	-2.0	-.5	-.1	.6	-2.5
30000	-1.6	-.6	-.1	1.0	-1.8
40000	-.3	-.6	-.1	1.8	-.4
50000	-.7	-.0	-.1	2.7	-.8
60000	-.1	.8	-.1	3.5	-.1
80000	.1	2.6	-.1	5.0	.1
100000	-.0	4.8	-.1	6.3	-.0

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 45 RHODIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-16.6	-.4	28.6	-16.7
1.5	-3.8	-.7	14.4	-3.9
2	1.9	-1.1	5.7	2.0
3	3.5	-1.6	.8	3.6
4	-4.1	-1.8	.5	-4.1
5	-3.8	-2.0	.5	-3.9
6	-4.0	-2.1	.8	-4.0
8	-4.2	-2.1	2.1	-4.2
10	-3.8	-2.2	1.0	-3.9
15	-1.4	-2.2	.3	-1.3
20	1.8	-2.4	.0	2.2
30	1.7	-1.9	.0	1.8
40	-.0	-3.0	.2	.0
50	-.6	-3.5	.2	-.5
60	-.7	-3.7	.1	-.5
80	-.1	-3.2	-.2	.0
100	.4	-3.1	.3	.7
150	.3	-2.7	.0	.7
200	-1.0	-2.0	.1	-1.7
300	-.6	-1.0	.2	-2.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.3	-.1	.1	-1.9	
500	-.1	.6	.1	-1.2	
600	.1	1.3	.1	-.4	
800	-.2	2.5	-.4	1.1	
1000	.1	3.7	.0	2.0	
1500	-.1	3.0	.0	-2.2	-4.0
2000	.2	2.6	.0	.7	3.1
3000	-.4	2.2	-.0	-.4	-2.2
4000	-.8	2.1	-.1	-1.3	-2.7
5000	-.9	1.9	-.1	-.2	-2.2
6000	.8	1.9	-.1	-.5	1.9
8000	2.1	1.8	-.1	.4	3.8
10000	1.1	1.7	-.1	2.2	1.7
15000	2.0	1.6	-.1	.2	2.7
20000	-.6	1.6	-.1	-.1	-.7
30000	-1.5	1.5	-.1	.3	-1.6
40000	-.4	1.5	-.1	1.2	-.5
50000	-.5	2.1	-.1	2.1	-.5
60000	.6	2.9	-.1	2.9	.6
80000	1.0	4.7	-.1	4.4	1.0
100000	.3	7.0	-.1	5.7	.3

Z= 46 PALLADIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-19.6	-.2	31.5	-19.6
1.5	-5.5	-.6	14.4	-5.5
2	.5	-1.0	5.2	.6
3	.3	-1.6	-.3	.3
4	-4.3	-1.8	-.8	-4.3
5	-2.9	-2.0	-.3	-2.8
6	-2.8	-2.2	.2	-2.8
8	-3.5	-2.1	.7	-3.5
10	-3.8	-2.1	.7	-3.9
15	-2.4	-1.9	.2	-2.5
20	1.0	-2.4	.0	1.3
30	-1.3	-1.8	-.0	-1.3
40	-.3	-2.4	.1	-.2
50	.5	-2.7	.2	.5
60	1.0	-2.7	.1	1.2
80	1.8	-2.1	-.2	2.1
100	2.1	-2.0	.3	2.5
150	1.5	-1.3	.1	2.2
200	.6	-.5	.1	1.0
300	-.3	.6	.1	-1.3

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.4	1.5	.2	-2.6	
500	-.2	2.1	.2	-2.5	
600	.0	2.9	.1	-1.5	
800	.2	4.1	.0	1.0	
1000	.2	5.4	.1	3.5	
1500	.0	4.7	.0	-.5	-.9
2000	-.2	4.3	.0	2.7	-5.3
3000	-.4	3.9	-.0	1.5	-2.4
4000	.3	3.7	-.1	.5	1.2
5000	1.2	3.6	-.1	1.7	3.2
6000	3.3	3.6	-.1	1.3	7.4
8000	3.9	3.5	-.0	2.2	7.0
10000	1.0	3.4	-.1	4.0	1.6
15000	-1.9	3.3	-.1	1.9	-2.5
20000	-4.0	3.3	-.1	1.5	-4.8
30000	-.9	3.2	-.1	1.9	-1.0
40000	1.0	3.1	-.1	2.7	1.1
50000	.2	3.8	-.1	3.6	.2
60000	.3	4.6	-.1	4.5	.3
80000	.2	6.4	-.1	6.0	.2
100000	1.1	8.6	-.1	7.3	1.2

Z= 47 SILVER

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-11.1	-.4	19.0	-11.2
1.5	-2.1	-.7	9.6	-2.1
2	-1.4	-1.0	4.2	-1.4
3	-1.9	-1.5	-.0	-2.0
4	-3.9	-1.7	-.7	-3.9
5	-2.5	-2.0	-.2	-2.6
6	-2.5	-2.1	.3	-2.5
8	-3.0	-2.0	.8	-3.1
10	-3.3	-2.1	.7	-3.3
15	-2.2	-2.2	.2	-2.2
20	.4	-2.2	.1	.6
30	.5	-1.7	.1	.5
40	-.3	-2.1	.2	-.3
50	-.7	-2.2	.2	-.7
60	-.8	-2.2	.1	-.8
80	-.7	-1.7	-.1	-.7
100	-.5	-1.5	.3	-.6
150	-.8	-.7	.1	-1.0
200	-1.0	.1	.2	-1.9
300	-1.0	1.3	.2	-3.4

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.6	2.3	.2	-3.7	
500	-.2	2.8	.1	-2.6	
600	.1	3.5	.1	-.6	
800	.4	4.7	.1	3.8	
1000	.5	6.0	.1	8.0	
1500	.1	5.3	.0	3.9	-2.2
2000	.1	4.9	.0	7.3	-1.5
3000	-.3	4.5	-.0	5.8	-2.2
4000	-.1	4.3	-.1	4.9	-.3
5000	.4	4.2	-.1	6.1	1.1
6000	2.4	4.1	-.1	5.8	5.3
8000	3.3	4.0	-.0	6.7	5.9
10000	1.3	4.0	-.1	8.6	1.9
15000	-.2	3.9	-.1	6.5	-.2
20000	-2.5	3.9	-.1	6.0	-3.1
30000	-.8	3.7	-.1	6.5	-1.0
40000	1.0	3.7	-.1	7.4	1.1
50000	.6	4.3	-.1	8.3	.7
60000	1.2	5.1	-.1	9.2	1.3
80000	1.2	6.9	-.1	10.8	1.2
100000	1.1	9.1	-.1	12.2	1.1

Z= 48 CADMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-21.7	-.5	18.8	-21.8
1.5	-2.8	-.6	9.0	-2.8
2	4.5	-.9	4.1	4.5
3	-1.9	-1.4	-.3	-1.9
4	-8.0	-1.7	-1.2	-8.0
5	-5.6	-2.0	-.7	-5.6
6	-4.8	-2.1	.0	-4.8
8	-4.3	-1.9	.9	-4.3
10	-3.9	-2.0	.8	-3.9
15	-2.4	-2.0	.1	-2.4
20	-.5	-2.2	.0	-.3
30	-.5	-1.6	.0	-.5
40	-1.7	-1.9	.2	-1.7
50	-2.0	-1.9	.2	-2.0
60	-1.8	-1.8	.2	-1.8
80	-1.1	-1.3	-.1	-1.1
100	-.5	-1.1	.4	-.6
150	-.2	-.2	.1	-.3
200	-.4	.7	.1	-.8
300	-.6	1.9	.2	-2.3

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.4	2.8	.1	-2.9	
500	-.2	3.5	.1	-2.4	
600	.0	4.3	.1	-1.2	
800	.3	5.4	.1	1.0	
1000	.3	6.6	.1	2.6	
1500	.0	5.8	.1	-1.3	-2.8
2000	.2	5.5	.0	1.8	2.0
3000	-.4	5.1	-.0	.2	-2.0
4000	-.6	4.9	-.1	-.7	-1.8
5000	-.5	4.8	-.1	.4	-1.2
6000	1.2	4.7	-.1	.0	2.7
8000	2.3	4.6	-.0	.9	4.1
10000	1.0	4.5	-.1	2.7	1.5
15000	1.3	4.4	-.1	.7	1.7
20000	-1.0	4.4	-.1	.2	-1.2
30000	-1.0	4.3	-.1	.7	-1.2
40000	-.3	4.2	-.1	1.5	-.3
50000	-.8	4.8	-.1	2.4	-.9
60000	-.2	5.6	-.1	3.2	-.2
80000	-.1	7.4	-.1	4.8	-.1
100000	-.5	9.6	-.1	6.1	-.5

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 49 INDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-19.8	-.5	21.7	-19.9
1.5	-8.9	-.6	10.8	-8.9
2	-4.7	-.9	5.2	-4.7
3	-3.3	-1.4	-.0	-3.4
4	-10.0	-1.7	-1.2	-10.1
5	-7.6	-1.9	-.8	-7.6
6	-5.7	-2.0	.0	-5.7
8	-3.8	-1.8	1.0	-3.8
10	-2.9	-1.8	-.6	-2.9
15	-1.1	-1.7	-.7	-1.1
20	.5	-2.1	-.5	.7
30	2.9	-1.7	-.2	3.0
40	.1	-1.9	.0	.2
50	-1.4	-1.8	.1	-1.4
60	-2.2	-1.7	.1	-2.2
80	-2.6	-1.3	-.3	-2.7
100	-2.4	-1.0	.3	-2.7
150	-2.0	-.0	-.0	-2.7
200	-1.8	.9	-.0	-3.0
300	-1.3	2.2	.1	-3.8

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.8	3.1	.1	-3.9	
500	-.3	3.7	.0	-3.0	
600	-.0	4.4	.0	-1.5	
800	.2	5.6	.0	1.2	
1000	.4	7.2	.1	3.4	
1500	.0	6.4	.0	-.4	-2.4
2000	.1	6.1	.0	2.8	-.9
3000	-.4	5.7	-.0	1.0	-2.1
4000	-.2	5.5	-.1	.1	-.5
5000	.2	5.4	-.1	1.3	.5
6000	2.0	5.3	-.1	.9	4.5
8000	2.9	5.2	-.0	1.9	5.1
10000	.9	5.1	-.1	3.7	1.3
15000	-.1	5.0	-.1	1.6	-.2
20000	-2.1	5.0	-.1	1.2	-2.5
30000	-.5	4.9	-.1	1.6	-.6
40000	.7	4.8	-.1	2.4	.8
50000	-.0	5.4	-.1	3.3	-.0
60000	.3	6.2	-.1	4.2	.3
80000	.3	8.0	-.1	5.7	.3
100000	.6	10.2	-.1	7.1	.6

Z= 50 TIN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-26.6	-.5	22.9	-26.6
1.5	-13.3	-.6	11.7	-13.3
2	-6.5	-.8	5.7	-6.5
3	-2.3	-1.4	.4	-2.3
4	.1	-1.6	-.7	.1
5	-4.0	-1.9	-.3	-4.0
6	-2.8	-1.9	.4	-2.7
8	-2.7	-1.7	1.1	-2.7
10	-3.2	-1.7	-.5	-3.2
15	-3.3	-1.2	-.6	-3.4
20	-1.8	-2.0	-.3	-1.8
30	-.5	-1.7	-.2	-.5
40	-.9	-1.9	-.0	-.9
50	-1.1	-1.8	.0	-1.0
60	-.9	-1.7	.0	-.9
80	-.4	-1.3	-.3	-.3
100	.1	-.9	.2	.2
150	.3	.0	-.0	.4
200	.0	.9	-.0	-.1
300	-.3	2.2	.1	-1.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.2	3.1	.1	-1.6	
500	.1	3.9	.1	-.6	
600	.3	4.5	.1	1.0	
800	.5	5.7	.0	4.6	
1000	.6	6.8	.1	7.7	
1500	.2	6.1	.0	3.9	-1.8
2000	.0	5.7	.0	7.3	-2.5
3000	-.3	5.3	-.0	5.3	-2.2
4000	.1	5.1	-.1	4.3	.3
5000	.7	4.9	-.1	5.5	1.9
6000	2.9	4.9	-.1	5.1	6.1
8000	3.9	4.8	-.1	6.1	6.8
10000	1.8	4.7	-.1	8.0	2.7
15000	.2	4.6	-.1	5.7	.2
20000	-2.2	4.6	-.1	5.3	-2.6
30000	-.7	4.5	-.1	5.7	-.7
40000	.6	4.4	-.1	6.6	.6
50000	-.3	5.0	-.1	7.5	-.3
60000	.1	5.7	-.1	8.4	.1
80000	.2	7.5	-.1	10.0	.2
100000	.9	9.7	-.1	11.4	1.0

Z= 51 ANTIMONY

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-19.3	-.5	24.3	-19.3
1.5	-9.2	-.6	12.0	-9.2
2	-3.8	-.8	5.1	-3.8
3	-.2	-1.3	-.5	-.2
4	-3.0	-1.6	-1.4	-3.0
5	-1.6	-1.8	-.8	-1.5
6	-2.2	-1.9	.1	-2.1
8	-3.6	-1.8	1.1	-3.6
10	-4.3	-2.0	.9	-4.3
15	-3.8	-3.2	.1	-3.8
20	-1.3	-1.9	.1	-1.3
30	4.6	-1.8	.0	5.5
40	-2.4	-1.8	.1	-2.4
50	-4.6	-1.7	.1	-4.7
60	-5.3	-1.6	.1	-5.5
80	-4.8	-1.2	-.2	-5.1
100	-3.6	-.9	.4	-4.0
150	-1.2	.1	.1	-1.5
200	.0	1.0	.1	-.1
300	.5	2.3	.1	.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.4	3.3	.2	.7	
500	.4	4.0	.1	.8	
600	.3	4.6	.1	.9	
800	.2	6.1	.1	.3	
1000	.1	6.9	.1	-1.6	
1500	-.1	6.1	.0	-5.2	-1.1
2000	-.2	5.7	.0	-2.0	-3.3
3000	-.5	5.3	-.0	-3.8	-2.3
4000	.1	5.1	-.1	-4.6	.6
5000	.8	5.0	-.1	-3.4	2.1
6000	2.9	4.9	-.1	-3.8	6.2
8000	3.6	4.8	-.0	-2.8	6.3
10000	1.1	4.7	-.1	-1.1	1.7
15000	-1.1	4.6	-.1	-3.1	-1.4
20000	-3.0	4.6	-.1	-3.6	-3.6
30000	-.4	4.5	-.1	-3.2	-.4
40000	1.1	4.4	-.1	-2.4	1.3
50000	.2	5.0	-.1	-1.5	.2
60000	.3	5.7	-.1	-.7	.4
80000	.1	7.5	-.1	.8	.2
100000	.8	9.6	-.1	2.1	.8

Z= 52 TELLURIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-24.2	-.5	36.0	-24.2
1.5	-8.9	-.6	18.0	-8.9
2	-4.7	-.8	8.7	-4.7
3	-3.3	-1.4	1.1	-3.3
4	-3.7	-1.6	-.5	-3.7
5	-5.6	-1.7	-.3	-5.6
6	-3.6	-1.8	.4	-3.6
8	-2.7	-1.7	1.1	-2.7
10	-2.8	-1.7	-.2	-2.8
15	-2.9	-2.1	-.7	-3.0
20	-2.0	-1.9	-.5	-2.0
30	1.8	-1.9	-.2	2.3
40	.3	-1.9	.0	.3
50	-.6	-1.8	.1	-.6
60	-.9	-1.7	.1	-.9
80	-.6	-1.3	-.3	-.6
100	.1	-1.0	2.1	.0
150	.7	.0	-.0	1.0
200	.7	1.0	-.0	1.0
300	.2	2.3	.1	.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.1	3.2	.1	-.5	
500	.1	3.9	.0	-.6	
600	.1	4.6	.0	-.1	
800	.2	5.7	.1	.4	
1000	.2	7.1	.1	.4	
1500	-.1	6.4	.0	-3.3	-2.5
2000	-.0	6.0	.0	-.2	-.9
3000	-.5	5.6	-.0	-1.9	-2.3
4000	-.4	5.4	-.1	-2.8	-.9
5000	-.0	5.3	-.1	-1.6	.0
6000	1.8	5.2	-.1	-2.0	3.9
8000	2.6	5.1	-.1	-1.0	4.5
10000	.6	5.0	-.1	.8	1.0
15000	-.3	4.9	-.1	-1.3	-.3
20000	-2.1	4.9	-.1	-1.8	-2.5
30000	-.7	4.8	-.1	-1.4	-.8
40000	.4	4.7	-.1	-.6	.4
50000	-.4	5.2	-.1	.3	-.4
60000	-.0	6.0	-.1	1.1	-.0
80000	.1	7.7	-.1	2.6	.1
100000	.5	9.8	-.1	3.9	.5

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 53 IODINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-20.4	-.4	35.2	-20.4
1.5	-13.1	-.6	17.7	-13.1
2	-9.0	-.9	8.9	-9.0
3	-6.4	-1.4	1.6	-6.5
4	-8.2	-1.5	-.0	-8.3
5	-5.2	-1.6	-.0	-5.2
6	-3.5	-1.7	.6	-3.4
8	-1.9	-1.7	1.2	-1.9
10	-1.4	-1.6	.6	-1.4
15	-1.1	-2.2	-.1	-1.0
20	-.7	-1.8	-.1	-.6
30	.3	-1.7	-.1	.5
40	-1.4	-1.6	.0	-1.4
50	-2.3	-1.4	.1	-2.3
60	-2.6	-1.3	.1	-2.7
80	-2.7	-.8	-.2	-2.8
100	-2.4	-.6	.3	-2.7
150	-1.7	.5	.0	-2.2
200	-1.3	1.5	-.0	-2.2
300	-.9	2.8	.1	-2.5

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.6	3.8	.1	-2.6	
500	-.2	4.5	.1	-2.2	
600	.0	5.2	.1	-1.4	
800	.2	6.3	.0	.4	
1000	.3	7.8	.1	1.7	
1500	-.0	7.0	.0	-2.0	-3.0
2000	.2	6.6	.0	1.1	1.0
3000	-.4	6.2	-.0	-.5	-2.0
4000	-.5	6.0	-.1	-1.4	-1.4
5000	-.4	5.9	-.1	-.2	-.8
6000	1.4	5.8	-.1	-.5	3.1
8000	2.5	5.7	-.1	.4	4.2
10000	.9	5.7	-.1	2.3	1.4
15000	.8	5.6	-.1	.1	1.0
20000	-1.3	5.5	-.1	-.4	-1.5
30000	-.8	5.4	-.1	-.1	-.9
40000	.1	5.4	-.1	.7	.1
50000	-.5	5.8	-.1	1.6	-.5
60000	.2	6.6	-.1	2.4	.2
80000	.6	8.3	-.1	4.0	.6
100000	.8	10.4	-.1	5.3	.8

Z= 54 XENON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-13.0	-.4	20.6	-13.0
1.5	-9.9	-.6	9.5	-9.9
2	-5.5	-.9	4.1	-5.5
3	-3.3	-1.5	.6	-3.3
4	-5.8	-1.5	-.5	-5.9
5	-2.3	-1.5	-.3	-2.3
6	-5.3	-1.7	.3	-5.3
8	-3.9	-1.6	1.0	-3.9
10	-3.6	-1.5	.9	-3.6
15	-2.8	-1.8	.2	-2.8
20	-1.4	-1.8	.2	-1.4
30	1.9	-1.6	.1	2.3
40	1.9	-1.3	.2	2.0
50	.4	-1.1	.2	.4
60	-.3	-.9	.2	-.3
80	-.5	-.4	-.3	-.5
100	-.0	-.1	.3	-.1
150	.9	1.0	-.0	1.0
200	1.1	2.0	-.0	1.5
300	.8	3.3	.0	1.3

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.5	4.3	.1	.7	
500	.3	5.1	.1	.3	
600	.2	5.7	.1	.1	
800	.2	7.2	.0	.1	
1000	.2	8.2	.1	-.4	
1500	-.1	7.5	.0	-3.8	-3.5
2000	.3	7.1	.0	-.6	4.0
3000	-.4	6.7	-.0	-2.1	-1.8
4000	-1.0	6.5	-.1	-2.9	-2.7
5000	-1.2	6.3	-.1	-1.7	-2.7
6000	.4	6.3	-.1	-2.0	1.0
8000	1.6	6.2	-.1	-1.1	2.7
10000	.7	6.1	-.1	.7	1.0
15000	1.9	6.0	-.1	-1.6	2.5
20000	-.3	6.0	-.1	-2.1	-.4
30000	-1.3	5.9	-.1	-1.8	-1.5
40000	-.8	5.8	-.1	-1.1	-.9
50000	-1.1	6.3	-.1	-.2	-1.1
60000	.0	7.0	-.1	.6	.0
80000	.9	8.7	-.1	2.0	1.0
100000	1.0	10.8	-.1	3.3	1.1

Z= 55 CESIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-5.4	-.5	1.1	-5.4
1.5	-17.8	-.8	3.1	-17.8
2	-12.8	-1.2	2.2	-12.8
3	-9.0	-1.5	.5	-9.0
4	-8.1	-1.3	-.6	-8.2
5	-8.7	-1.4	-.5	-8.8
6	-6.0	-1.6	-.0	-6.0
8	-2.4	-1.7	.8	-2.4
10	-1.3	-1.5	.8	-1.3
15	-.9	-1.4	.1	-.9
20	-.8	-1.7	.0	-.8
30	.4	-1.4	.0	.6
40	1.2	-1.0	.2	1.2
50	.2	-.7	.2	.2
60	-.2	-.5	.1	-.2
80	-.2	.1	-.3	-.2
100	.3	.4	.3	.3
150	1.0	1.5	-.0	1.2
200	1.2	2.5	-.1	1.5
300	.8	4.0	-.0	1.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.5	4.9	.0	.6	
500	.3	5.7	.0	.3	
600	.3	6.5	.0	.2	
800	.3	7.4	.1	.3	
1000	.2	8.8	.1	-.1	
1500	-.1	8.0	.0	-3.6	-4.1
2000	.5	7.6	.0	-.5	6.0
3000	-.3	7.2	-.0	-2.0	-1.2
4000	-1.1	7.0	-.1	-2.8	-3.1
5000	-1.5	6.9	-.1	-1.6	-3.5
6000	-.1	6.8	-.1	-2.0	-.0
8000	1.2	6.7	-.1	-1.0	2.1
10000	.7	6.7	-.1	.8	1.0
15000	3.0	6.6	-.1	-1.6	3.8
20000	.9	6.6	-.1	-2.1	1.1
30000	-.8	6.4	-.1	-1.8	-.9
40000	-.7	6.4	-.1	-1.0	-.8
50000	-1.1	6.8	-.1	-.2	-1.2
60000	.0	7.6	-.1	.6	.0
80000	1.0	9.3	-.1	2.1	1.0
100000	.9	11.3	-.1	3.3	.9

Z= 56 BARIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-16.8	-.7	-4.1	-16.8
1.5	-21.1	-.9	-.0	-21.1
2	-13.0	-1.1	1.1	-13.0
3	-5.8	-1.4	.7	-5.9
4	-4.5	-1.4	-.2	-4.5
5	-6.8	-1.4	-.4	-6.9
6	-6.1	-1.6	-.1	-6.1
8	-1.6	-1.8	.6	-1.6
10	-.5	-1.8	.7	-.5
15	-1.0	-2.2	.1	-1.0
20	-1.8	-1.7	-.0	-1.8
30	-1.9	-1.2	-.1	-2.0
40	.0	-.7	.1	.1
50	-1.5	-.3	.1	-1.6
60	-2.1	-.0	.1	-2.2
80	-1.9	.7	-.3	-2.1
100	-1.1	1.0	.4	-1.3
150	.5	2.1	-.0	.6
200	1.2	3.2	-.0	1.4
300	1.1	4.7	.0	1.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.7	5.8	.0	1.2	
500	.5	6.4	.1	.9	
600	.4	7.2	.1	.7	
800	.3	8.5	.1	.1	
1000	.1	9.6	.1	-1.2	
1500	-.2	8.9	.0	-4.6	-3.9
2000	.4	8.5	-.0	-1.5	4.8
3000	-.4	8.1	-.1	-2.9	-1.6
4000	-1.0	7.9	-.2	-3.7	-2.8
5000	-1.3	7.7	-.1	-2.5	-2.9
6000	.3	7.6	-.1	-2.9	.8
8000	1.8	7.5	-.1	-1.9	3.0
10000	1.2	7.5	-.1	-.1	1.8
15000	3.2	7.4	-.1	-2.5	4.1
20000	1.0	7.4	-.1	-3.0	1.2
30000	-.4	7.3	-.1	-2.8	-.4
40000	.0	7.2	-.1	-2.0	.0
50000	-.3	7.6	-.1	-1.2	-.3
60000	.9	8.4	-.1	-.4	.9
80000	1.7	10.0	-.1	1.0	1.8
100000	1.4	12.1	-.1	2.3	1.5

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 57 LANTHANUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-17.5	-.8	-7.6	-17.5
1.5	-24.9	-.9	-2.1	-24.9
2	-16.5	-1.1	.4	-16.6
3	-7.4	-1.5	1.2	-7.5
4	-4.7	-1.5	.8	-4.7
5	-6.6	-1.4	.6	-6.8
6	-1.1	-1.5	.8	-1.1
8	-1.8	-1.8	1.4	-1.8
10	-1.9	-1.9	4.6	-1.9
15	-2.6	-2.4	2.9	-2.6
20	-2.4	-1.7	1.9	-2.4
30	.1	-1.3	.7	.2
40	-.1	-.9	.5	-.1
50	-1.4	-.6	.4	-1.4
60	-1.9	-.3	.3	-1.9
80	-1.7	.3	-.2	-1.8
100	-1.0	.6	.4	-1.2
150	.1	1.7	.0	.1
200	.6	2.7	-.0	.6
300	.6	4.1	.0	.6

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.4	5.1	.1	.1	
500	.3	5.9	.1	.0	
600	.3	6.6	.1	.2	
800	.2	7.8	.0	.3	
1000	.2	9.1	.1	-.0	
1500	-.2	8.3	.0	-3.4	-4.1
2000	.5	7.9	-.0	-.3	5.7
3000	-.3	7.5	-.1	-1.6	-1.2
4000	-1.1	7.3	-.2	-2.4	-2.8
5000	-1.5	7.2	-.1	-1.1	-3.3
6000	.1	7.1	-.1	-1.5	.3
8000	1.3	7.0	-.1	-.5	2.3
10000	.7	7.0	-.1	1.3	1.1
15000	2.7	6.9	-.1	-1.1	3.5
20000	.6	6.8	-.1	-1.7	.7
30000	-1.0	6.7	-.1	-1.4	-1.1
40000	-.8	6.6	-.1	-.7	-.8
50000	-1.1	7.0	-.1	.2	-1.2
60000	-.0	7.8	-.1	1.0	-.0
80000	.7	9.5	-.1	2.4	.7
100000	.2	11.5	-.1	3.7	.2

Z= 58 CERIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-19.3	-.9	-12.9	-19.3
1.5	-21.4	-1.2	-6.4	-21.4
2	-14.3	-1.7	-2.5	-14.3
3	-8.2	-2.4	-.1	-8.2
4	-6.2	-2.6	.3	-6.3
5	-6.3	-2.5	.2	-6.4
6	.4	-2.5	.4	.5
8	-2.6	-2.6	1.0	-2.6
10	-1.4	-2.3	4.5	-1.4
15	-1.9	-1.9	3.2	-1.9
20	-2.6	-2.0	2.1	-2.7
30	-2.1	-1.7	.8	-2.2
40	.7	-1.4	.5	.9
50	-2.9	-1.2	.4	-2.9
60	-3.0	-1.0	.3	-3.1
80	-2.3	-.4	-.2	-2.5
100	-1.2	-.2	.4	-1.4
150	.7	.8	-.1	.8
200	1.5	1.7	-.1	1.9
300	1.5	3.1	.0	2.5

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.0	4.2	.0	2.1	
500	.7	4.9	.0	1.6	
600	.5	5.6	.0	1.2	
800	.3	6.8	.1	.1	
1000	.1	7.9	.0	-1.7	
1500	-.3	7.1	.0	-5.0	-3.4
2000	.5	6.7	-.0	-1.8	6.3
3000	-.3	6.3	-.1	-2.9	-.7
4000	-1.0	6.1	-.2	-3.5	-2.4
5000	-1.3	6.0	-.1	-2.2	-2.7
6000	.4	5.9	-.1	-2.5	.9
8000	1.9	5.8	-.1	-1.5	3.2
10000	1.5	5.8	-.1	.4	2.2
15000	3.5	5.7	-.1	-1.9	4.5
20000	1.1	5.7	-.1	-2.5	1.3
30000	-.9	5.6	-.1	-2.2	-.9
40000	-.6	5.5	-.2	-1.4	-.6
50000	-.8	5.8	-.1	-.6	-.8
60000	.4	6.6	-.1	.2	.4
80000	1.1	8.2	-.1	1.6	1.1
100000	.4	10.2	-.2	2.9	.4

Z= 59 PRASEODYMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-19.7	-.7	-15.2	-19.7
1.5	-22.0	-.8	-8.9	-22.1
2	-17.4	-1.0	-5.0	-17.4
3	-12.8	-1.4	-2.5	-12.9
4	-10.6	-1.4	-1.9	-10.7
5	-9.2	-1.5	-1.7	-9.3
6	-.5	-1.7	-1.2	-.5
8	-3.8	-1.8	-.2	-3.9
10	-1.6	-1.7	3.7	-1.6
15	-.6	-.8	2.7	-.7
20	-.8	-1.8	1.8	-.8
30	-.2	-1.6	.6	-.1
40	1.6	-1.7	.5	2.0
50	.2	-1.6	.4	.2
60	-.2	-1.5	.3	-.1
80	-.2	-.9	-.3	-.2
100	.2	-.7	.4	.2
150	.7	.1	-.1	.8
200	.6	1.0	-.1	.8
300	.3	2.4	.0	.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	3.3	-.0	-.4	
500	.1	4.1	.0	-.6	
600	.1	4.8	.0	-.5	
800	.2	5.9	.1	-.2	
1000	.2	7.2	.0	-.5	
1500	-.2	6.4	.0	-3.7	-3.9
2000	.5	6.0	-.0	-.5	6.4
3000	-.4	5.6	-.1	-1.7	-1.3
4000	-1.3	5.4	-.2	-2.4	-3.4
5000	-1.8	5.3	-.1	-1.2	-4.0
6000	-.3	5.2	-.1	-1.6	-.5
8000	1.1	5.1	-.1	-.7	1.8
10000	.8	5.0	-.1	1.1	1.2
15000	3.4	5.0	-.1	-1.4	4.4
20000	1.4	4.9	-.1	-2.0	1.7
30000	-.5	4.8	-.2	-1.8	-.6
40000	-.4	4.7	-.1	-1.1	-.4
50000	-.6	5.1	-.2	-.3	-.7
60000	.5	5.8	-.2	.5	.6
80000	1.2	7.4	-.2	1.9	1.2
100000	.4	9.4	-.2	3.2	.4

Z= 60 NEODYMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	16.7	-.7	-15.1	16.7
1.5	-25.5	-.8	-9.0	-25.5
2	-19.5	-1.0	-5.1	-19.5
3	-13.7	-1.4	-2.5	-13.8
4	-10.7	-1.4	-1.8	-10.8
5	-9.0	-1.5	-1.6	-9.1
6	-8.1	-1.7	-1.2	-8.3
8	-4.0	-2.0	-.2	-4.0
10	-2.2	-2.0	3.5	-2.2
15	-1.6	-2.1	2.5	-1.6
20	-1.5	-1.8	1.7	-1.5
30	.1	-1.7	.6	.3
40	3.1	-2.0	.5	3.8
50	-.3	-2.1	.4	-.3
60	-.5	-2.1	.2	-.5
80	-.3	-1.5	-.2	-.3
100	.0	-1.4	.4	.1
150	.3	-.7	-.0	.4
200	.0	.1	-.1	.1
300	-.4	1.4	.1	-1.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.4	2.4	.1	-1.5	
500	-.2	3.1	.1	-1.4	
600	.0	3.8	.1	-.8	
800	.3	5.0	.1	.2	
1000	.2	6.2	.0	.6	
1500	-.2	5.4	-.0	-2.8	-2.9
2000	.1	5.0	-.0	.3	1.2
3000	-.5	4.6	-.1	-1.0	-2.1
4000	-.7	4.4	-.2	-1.8	-1.7
5000	-.6	4.3	-.1	-.5	-1.1
6000	1.3	4.2	-.1	-1.0	2.7
8000	2.5	4.1	-.1	-.0	4.1
10000	1.1	4.0	-.1	1.8	1.7
15000	1.1	3.9	-.2	-.7	1.4
20000	-1.2	3.9	-.2	-1.4	-1.3
30000	-.8	3.8	-.2	-1.2	-.9
40000	.4	3.7	-.2	-.5	.5
50000	.1	4.1	-.2	.3	.2
60000	1.0	4.8	-.2	1.1	1.1
80000	1.3	6.4	-.2	2.6	1.4
100000	1.0	8.3	-.2	3.9	1.1

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 61 PROMETHIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-23.5	-.6	-13.2	-23.5	400	.2	1.4	-.0	.3	
1.5	-25.5	-.8	-7.6	-25.5	500	.1	2.2	-.0	-.2	
2	-20.0	-1.0	-4.2	-20.1	600	.1	2.9	.0	-.4	
3	-13.9	-1.3	-2.0	-14.0	800	.2	3.9	.2	-.4	
4	-10.9	-1.4	-1.4	-11.0	1000	.0	5.1	.0	-.8	
5	-9.1	-1.4	-1.4	-9.3	1500	-.3	4.4	-.0	-4.0	-2.4
6	-8.1	-1.6	-1.1	-8.2	2000	-.1	4.0	-.0	-.9	-.6
8	-4.5	-1.9	-.2	-4.6	3000	-.6	3.6	-.1	-1.9	-2.2
10	-3.7	-1.8	3.0	-3.7	4000	-.4	3.4	-.2	-2.5	-.8
15	-2.5	-1.0	2.2	-2.6	5000	.0	3.3	-.1	-1.3	.2
20	-1.3	-1.7	1.5	-1.3	6000	2.0	3.2	-.1	-1.6	4.1
30	1.1	-1.8	.5	1.3	8000	3.1	3.1	-.1	-.7	5.1
40	2.6	-2.3	.4	3.3	10000	1.4	3.1	-.1	1.2	2.0
50	-.2	-2.6	.3	-.2	15000	.3	3.0	-.2	-1.3	.4
60	-.5	-2.7	.2	-.4	20000	-2.0	2.9	-.2	-2.0	-2.3
80	-.5	-2.1	-.3	-.3	30000	-1.2	2.8	-.2	-1.9	-1.3
100	-.1	-2.1	.4	.0	40000	.1	2.8	-.2	-1.2	.1
150	.7	-1.5	-.1	.9	50000	-.4	3.1	-.2	-.4	-.5
200	.8	-.8	-.1	1.2	60000	.1	3.7	-.2	.4	.1
300	.5	.5	-.0	.9	80000	.2	5.3	-.2	1.8	.2
					100000	.1	7.2	-.2	3.1	.1

Z= 62 SAMARIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-22.8	-.6	-10.5	-22.9	400	.2	2.3	-.0	.3	
1.5	-24.1	-.7	-5.5	-24.1	500	.1	3.0	.0	-.2	
2	-20.9	-.9	-2.6	-20.9	600	.1	3.8	.0	-.2	
3	-14.1	-1.3	-.6	-14.2	800	.2	4.9	.1	-.2	
4	-10.7	-1.4	-.3	-10.8	1000	.1	6.0	.0	-.8	
5	-8.6	-1.4	-.5	-8.7	1500	-.3	5.3	-.0	-4.0	-2.1
6	-7.3	-1.6	-.5	-7.4	2000	-.0	4.9	-.0	-.9	.1
8	-5.3	-1.8	-.1	-5.3	3000	-.6	4.5	-.1	-2.0	-2.0
10	-2.3	-1.8	2.5	-2.3	4000	-.5	4.3	-.2	-2.7	-.9
15	-.9	-1.3	2.0	-.9	5000	-.1	4.2	-.1	-1.4	-.0
20	-1.2	-1.8	1.5	-1.1	6000	1.9	4.1	-.1	-1.8	3.9
30	-1.0	-1.4	.7	-1.0	8000	3.1	4.0	-.1	-.9	5.0
40	.3	-1.9	.5	.5	10000	1.5	3.9	-.1	1.0	2.2
50	-1.1	-2.2	.4	-1.0	15000	.9	3.8	-.2	-1.6	1.2
60	-.7	-2.2	.3	-.7	20000	-1.2	3.8	-.2	-2.3	-1.3
80	.2	-1.4	-.3	.3	30000	-.3	3.7	-.2	-2.1	-.3
100	1.1	-1.4	.4	1.2	40000	.9	3.6	-.2	-1.4	1.0
150	1.9	-.8	-.1	2.3	50000	.4	3.9	-.2	-.6	.5
200	1.6	.0	-.1	2.3	60000	1.0	4.6	-.2	.1	1.1
300	.8	1.3	.0	1.2	80000	1.1	6.2	-.2	1.6	1.1
					100000	.8	8.1	-.2	2.8	.8

Z= 63 EUROPIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-23.4	-.6	-3.9	-23.5	400	-.0	-.7	.0	.1	
1.5	-25.9	-.8	-.7	-26.0	500	-.1	.0	.0	-.2	
2	-23.5	-.9	.6	-23.6	600	.0	.8	.1	-.2	
3	-16.1	-1.3	.9	-16.2	800	.1	1.8	.1	-.1	
4	-12.0	-1.4	.5	-12.1	1000	.0	2.8	.0	-.5	
5	-9.2	-1.5	.1	-9.4	1500	-.3	2.0	-.0	-3.8	-2.6
6	-7.4	-1.7	.0	-7.5	2000	.1	1.7	-.0	-.7	1.4
8	-5.6	-1.9	.3	-5.6	3000	-.5	1.3	-.1	-1.7	-1.7
10	-3.7	-2.2	.6	-3.7	4000	-.6	1.1	-.2	-2.5	-1.2
15	-1.5	-3.1	.5	-1.5	5000	-.4	1.0	-.2	-1.2	-.6
20	-1.2	-1.8	.0	-1.2	6000	1.6	.9	-.1	-1.5	3.2
30	-1.0	-1.9	-.1	-.9	8000	2.8	.8	-.1	-.6	4.6
40	-.3	-3.0	.1	.0	10000	1.5	.7	-.2	1.3	2.2
50	-1.2	-3.7	.2	-1.1	15000	1.4	.6	-.2	-1.3	1.7
60	-1.2	-4.1	.1	-1.1	20000	-.9	.6	-.2	-2.0	-1.1
80	-.7	-3.4	-.3	-.6	30000	-.9	.5	-.2	-1.9	-.9
100	-.0	-3.6	.4	.1	40000	.2	.4	-.2	-1.2	.2
150	.8	-3.3	-.1	1.2	50000	-.2	.7	-.2	-.5	-.2
200	.8	-2.7	-.1	1.3	60000	.5	1.3	-.2	.3	.5
300	.3	-1.6	-.0	.7	80000	.7	2.8	-.2	1.7	.8
					100000	.4	4.7	-.2	3.0	.4

Z= 64 GADOLINIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	-21.6	-.6	-2.4	-21.6	400	.7	-1.1	-.0	1.9	
1.5	-11.4	-.7	.8	-11.4	500	.6	-.5	-.0	1.9	
2	-20.8	-.9	2.1	-20.9	600	.5	.3	-.0	1.8	
3	-14.0	-1.3	2.3	-14.0	800	.3	1.3	.1	1.0	
4	-10.1	-1.4	1.7	-10.1	1000	-.0	2.2	.0	-.8	
5	-7.6	-1.4	1.2	-7.8	1500	-.4	1.5	-.0	-4.1	-2.7
6	-6.3	-1.5	1.1	-6.4	2000	.0	1.1	-.1	-1.1	1.6
8	-4.1	-1.7	1.2	-4.1	3000	-.6	.7	-.1	-2.0	-2.2
10	-3.9	-1.8	2.6	-3.9	4000	-.9	.5	-.2	-2.8	-2.0
15	-1.5	-1.3	1.8	-1.5	5000	-.8	.4	-.2	-1.5	-1.5
20	-1.2	-1.7	1.2	-1.2	6000	1.1	.3	-.2	-1.9	2.3
30	-1.0	-1.9	.5	-1.0	8000	2.3	.2	-.2	-.9	3.8
40	-.6	-3.2	.5	-.3	10000	1.2	.2	-.2	.9	1.8
50	.0	-4.0	.4	.6	15000	1.5	.1	-.2	-1.7	2.0
60	-3.5	-4.5	.2	-3.5	20000	-.6	.1	-.2	-2.5	-.7
80	-3.1	-3.7	-.3	-3.1	30000	-.7	-.0	-.2	-2.4	-.7
100	-2.5	-3.9	.5	-2.5	40000	.3	-.1	-.2	-1.7	.4
150	-1.0	-3.7	-.1	-.9	50000	-.0	.1	-.2	-.9	-.0
200	-.0	-3.2	-.2	.3	60000	.8	.8	-.2	-.2	.8
300	.8	-2.0	.0	1.5	80000	1.0	2.3	-.2	1.3	1.1
					100000	.5	4.1	-.2	2.5	.5

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 65 TERBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-23.9	-.6	-3.5	-24.0
1.5	-10.4	-.7	.3	-10.4
2	-24.2	-.8	2.0	-24.2
3	-16.3	-1.2	2.7	-16.4
4	-12.1	-1.4	2.2	-12.2
5	-9.2	-1.5	1.7	-9.4
6	-7.3	-1.6	1.4	-7.4
8	-4.5	-1.8	1.4	-4.5
10	-5.5	-2.0	2.1	-5.6
15	-2.4	-1.7	1.6	-2.4
20	-1.9	-1.8	1.2	-1.9
30	-1.6	-1.9	.5	-1.6
40	-1.1	-3.4	.5	-.9
50	-.3	-4.5	.4	.2
60	-.4	-5.1	.3	-.2
80	.5	-4.2	-.3	.7
100	.9	-4.5	.4	1.2
150	1.1	-4.5	-.1	1.6
200	.9	-3.9	-.2	1.6
300	.4	-2.9	.0	1.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.1	-2.0	-.0	.5	
500	.0	-1.3	-.0	.3	
600	.0	-.6	.0	.2	
800	.1	.4	.1	-.0	
1000	-.1	1.3	.0	-1.0	
1500	-.4	.6	-.0	-4.2	-3.5
2000	.2	.2	-.1	-1.2	3.4
3000	-.5	-.1	-.1	-2.1	-1.7
4000	-1.0	-.3	-.2	-2.8	-2.3
5000	-1.1	-.5	-.2	-1.5	-2.2
6000	.6	-.5	-.2	-1.9	1.3
8000	1.9	-.6	-.2	-.9	3.1
10000	1.0	-.7	-.2	1.0	1.5
15000	2.0	-.8	-.2	-1.7	2.5
20000	-.0	-.8	-.2	-2.4	-.0
30000	-.4	-.9	-.2	-2.3	-.5
40000	.6	-1.0	-.2	-1.7	.6
50000	.4	-.8	-.2	-.9	.4
60000	1.4	-.1	-.2	-.1	1.4
80000	1.5	1.3	-.2	1.3	1.6
100000	.5	3.1	-.2	2.6	.5

Z= 66 DYSPROSIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-23.7	-.6	-4.0	-23.8
1.5	-16.3	-.7	-.6	-16.3
2	-23.4	-.8	.9	-23.4
3	-16.6	-1.2	1.2	-16.7
4	-12.3	-1.3	.9	-12.4
5	-9.5	-1.5	.5	-9.6
6	-7.4	-1.6	.5	-7.5
8	-3.5	-1.8	.9	-3.6
10	-5.7	-2.0	1.1	-5.8
15	-2.2	-1.8	.7	-2.2
20	-1.4	-1.8	.5	-1.3
30	-.7	-1.9	.3	-.6
40	-.4	-3.6	.3	-.1
50	-.3	-4.8	.3	.3
60	-.3	-5.6	.2	-.2
80	.5	-4.7	-.4	.8
100	.8	-5.0	.4	1.1
150	.9	-5.1	-.2	1.4
200	.6	-4.6	-.2	1.3
300	.1	-3.5	-.1	.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.1	-2.7	-.0	.2	
500	-.1	-2.0	-.0	-.1	
600	-.0	-1.3	.0	-.0	
800	.0	-.3	.1	-.3	
1000	-.2	.6	.0	-1.2	
1500	-.5	-.1	-.0	-4.4	-2.6
2000	-.0	-.5	-.1	-1.4	1.0
3000	-.6	-.8	-.1	-2.2	-1.7
4000	-.6	-1.0	-.2	-2.9	-1.1
5000	-.3	-1.2	-.2	-1.5	-.4
6000	1.6	-1.2	-.2	-1.9	3.3
8000	2.7	-1.3	-.2	-.9	4.4
10000	1.3	-1.4	-.2	1.0	1.8
15000	.8	-1.5	-.2	-1.6	1.0
20000	-1.4	-1.5	-.2	-2.4	-1.6
30000	-1.0	-1.6	-.2	-2.3	-1.1
40000	.1	-1.7	-.2	-1.6	.1
50000	-.3	-1.5	-.2	-.9	-.3
60000	.4	-.9	-.2	-.1	.5
80000	.6	.6	-.2	1.3	.6
100000	.2	2.3	-.2	2.6	.2

Z= 67 HOLMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-24.4	-.7	-3.8	-24.4
1.5	-16.8	-1.0	-.6	-16.8
2	-24.6	-1.3	.9	-24.6
3	-16.9	-1.9	1.2	-17.0
4	-11.8	-2.2	.8	-11.9
5	-8.5	-2.3	.5	-8.6
6	-6.1	-2.2	.5	-6.2
8	-3.0	-2.4	.9	-3.0
10	-7.8	-2.5	.4	-7.8
15	-2.1	-2.4	.3	-2.1
20	-1.1	-2.0	.1	-1.1
30	-1.6	-2.1	.1	-1.6
40	-2.5	-4.0	.3	-2.4
50	-3.2	-5.3	.3	-3.1
60	-2.8	-6.2	.2	-2.7
80	-1.2	-5.3	-.3	-1.1
100	-.4	-5.6	.4	-.2
150	.6	-5.8	-.1	1.1
200	.9	-5.3	-.2	1.6
300	.7	-4.3	-.0	1.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.4	-3.5	-.0	1.4	
500	.3	-2.8	.0	1.2	
600	.2	-2.1	-.0	1.0	
800	.0	-1.2	.1	-.2	
1000	-.4	-.3	.0	-2.5	
1500	-.6	-1.0	-.0	-5.4	-3.9
2000	-.1	-1.4	-.1	-2.4	1.6
3000	-.7	-1.8	-.1	-3.0	-2.1
4000	-1.0	-2.0	-.2	-3.7	-2.0
5000	-.9	-2.1	-.2	-2.3	-1.6
6000	.9	-2.2	-.2	-2.7	2.0
8000	2.1	-2.3	-.2	-1.8	3.5
10000	1.0	-2.3	-.2	.1	1.5
15000	1.5	-2.4	-.2	-2.7	1.9
20000	-.4	-2.4	-.2	-3.5	-.4
30000	-.5	-2.5	-.2	-3.4	-.5
40000	.5	-2.6	-.2	-2.8	.5
50000	.1	-2.4	-.2	-2.1	.1
60000	.9	-1.8	-.2	-1.3	1.0
80000	1.3	-.4	-.2	.0	1.3
100000	.8	1.3	-.2	1.3	.9

Z= 68 ERBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-25.9	-.5	-4.9	-25.9
1.5	-16.1	-.6	-1.3	-16.1
2	-21.6	-.7	.7	-21.7
3	-17.2	-1.1	1.6	-17.3
4	-11.8	-1.3	1.3	-11.8
5	-8.1	-1.5	.9	-8.2
6	-5.6	-1.5	.7	-5.7
8	-2.7	-1.7	.8	-2.8
10	-11.2	-1.8	-.3	-11.3
15	-2.7	-1.0	.0	-2.7
20	-.4	-1.8	.0	-.4
30	.2	-2.0	.2	.4
40	-.1	-4.2	.4	.3
50	-.1	-5.8	.4	.6
60	-2.0	-6.9	.4	-1.8
80	-.4	-5.9	-.2	-.1
100	.3	-6.3	.5	.6
150	.8	-6.6	-.0	1.3
200	.7	-6.2	-.0	1.4
300	.3	-5.3	.1	1.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	-4.5	.0	.6	
500	-.1	-3.8	.1	.3	
600	-.0	-3.1	.1	.2	
800	.0	-2.3	.1	.0	
1000	-.1	-1.1	.0	-.6	
1500	-.5	-1.9	-.0	-3.7	-3.9
2000	.1	-2.2	-.1	-.7	2.8
3000	-.5	-2.6	-.1	-1.3	-1.5
4000	-.9	-2.8	-.3	-2.0	-2.0
5000	-1.0	-2.9	-.2	-.6	-1.9
6000	.7	-3.0	-.2	-1.0	1.6
8000	1.9	-3.1	-.2	-.0	3.1
10000	.9	-3.2	-.2	1.9	1.4
15000	1.9	-3.2	-.2	-1.0	2.4
20000	.1	-3.3	-.2	-1.8	.1
30000	-.3	-3.3	-.2	-1.8	-.3
40000	.4	-3.4	-.2	-1.2	.5
50000	.0	-3.3	-.2	-.5	.0
60000	.9	-2.7	-.2	.3	.9
80000	1.2	-1.2	-.2	1.7	1.3
100000	.8	.4	-.2	2.9	.8

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 69 THULIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-25.6	-.5	-3.4	-25.6
1.5	-19.6	-.6	-.7	-19.6
2	-21.5	-.7	.7	-21.5
3	-17.4	-1.0	1.0	-17.4
4	-11.6	-1.3	.6	-11.7
5	-7.8	-1.4	.3	-7.9
6	-5.1	-1.5	.2	-5.2
8	-2.2	-1.6	.5	-2.2
10	-4.9	-1.8	-1.1	-5.0
15	-2.3	-.9	-.9	-2.3
20	-1.3	-1.7	-.8	-1.3
30	-1.7	-2.1	-.2	-1.7
40	-2.3	-4.5	.1	-2.2
50	-2.7	-6.3	.2	-2.3
60	-2.4	-7.6	.1	-2.3
80	-.3	-6.6	-.4	-.0
100	.6	-7.1	.4	1.0
150	1.2	-7.5	-.2	1.9
200	1.1	-7.1	-.2	2.0
300	.4	-6.3	-.1	1.4

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.0	-5.5	-.0	.8	
500	-.1	-4.9	-.0	.4	
600	-.1	-4.1	.0	.2	
800	-.1	-3.3	.1	-.1	
1000	-.1	-2.4	.1	-.8	
1500	-.5	-3.1	.0	-3.8	-3.5
2000	.2	-3.4	-.0	-.8	2.9
3000	-.5	-3.8	-.1	-1.3	-1.6
4000	-.9	-4.0	-.2	-1.9	-2.1
5000	-1.0	-4.1	-.1	-.5	-2.0
6000	.6	-4.2	-.1	-.9	1.3
8000	1.7	-4.3	-.1	.1	2.7
10000	.6	-4.4	-.1	2.0	.9
15000	1.2	-4.4	-.2	-.9	1.5
20000	-.7	-4.4	-.2	-1.7	-.8
30000	-.9	-4.5	-.2	-1.8	-.9
40000	.3	-4.6	-.2	-1.1	.3
50000	.2	-4.5	-.2	-.4	.2
60000	1.2	-3.9	-.2	.4	1.3
80000	1.7	-2.5	-.2	1.8	1.8
100000	1.2	-.9	-.2	3.0	1.2

Z= 70 YTTERBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-20.8	-.5	-3.1	-20.8
1.5	-9.0	-.6	-.7	-9.1
2	-20.6	-.7	.6	-20.7
3	-17.6	-1.0	.9	-17.7
4	-11.7	-1.2	.5	-11.8
5	-7.8	-1.4	.1	-7.8
6	-5.0	-1.4	.0	-5.1
8	-1.7	-1.6	.3	-1.7
10	1.2	-1.9	.5	1.2
15	-.2	-1.3	.5	-.2
20	-.7	-1.7	.1	-.7
30	-1.4	-2.2	-.1	-1.4
40	-1.6	-4.8	.1	-1.3
50	-1.6	-6.9	.2	-1.0
60	-1.7	-8.3	.1	-.8
80	-1.9	-7.2	-.5	-1.7
100	-3.3	-7.8	.4	-3.1
150	-4.1	-8.3	-.2	-4.2
200	-3.8	-8.0	-.3	-4.1
300	-2.5	-7.2	-.1	-3.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-1.4	-6.4	-.1	-1.9	
500	-.7	-5.8	-.0	-.9	
600	-.2	-5.1	.0	.0	
800	.0	-4.2	.0	.8	
1000	-.0	-3.4	.1	.1	
1500	-.4	-4.1	.0	-2.9	-2.8
2000	.2	-4.5	-.0	.1	2.3
3000	-.5	-4.9	-.1	-.5	-1.4
4000	-.7	-5.1	-.2	-1.1	-1.5
5000	-.6	-5.2	-.1	.2	-1.2
6000	1.2	-5.2	-.1	-.2	2.3
8000	2.2	-5.3	-.1	.8	3.5
10000	.9	-5.4	-.2	2.8	1.3
15000	.9	-5.5	-.2	-.2	1.2
20000	-1.0	-5.5	-.2	-1.0	-1.2
30000	-.8	-5.6	-.2	-1.1	-.8
40000	.5	-5.7	-.2	-.4	.6
50000	.4	-5.5	-.2	.3	.4
60000	1.3	-5.0	-.2	1.1	1.4
80000	1.6	-3.6	-.2	2.5	1.7
100000	1.0	-2.0	-.2	3.7	1.1

Z= 71 LUTETIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-21.0	-.6	-.6	-21.0
1.5	-9.3	-.7	.6	-9.4
2	-9.2	-.7	1.5	-9.2
3	-17.8	-1.0	1.4	-17.9
4	-11.7	-1.3	.8	-11.8
5	-8.0	-1.4	.4	-8.1
6	-5.5	-1.4	.2	-5.5
8	-2.3	-1.5	.4	-2.3
10	.6	-1.7	-1.6	.7
15	-.5	-.9	-1.6	-.5
20	-.1	-1.7	-1.4	.0
30	-1.5	-2.2	-.4	-1.4
40	-2.7	-5.0	.0	-2.5
50	-3.3	-7.2	.2	-2.9
60	-3.3	-8.7	.1	-2.6
80	-.9	-7.7	-.5	-.7
100	.1	-8.3	.4	.5
150	.5	-8.9	-.2	1.2
200	.3	-8.7	-.3	1.1
300	-.3	-7.9	-.1	.5

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.5	-7.1	-.0	.0	
500	-.3	-6.5	-.0	.0	
600	-.2	-5.8	.0	.2	
800	-.1	-5.1	.0	.2	
1000	-.1	-4.1	.1	-.4	
1500	-.5	-4.8	.0	-3.5	-3.3
2000	.1	-5.2	-.0	-.6	2.7
3000	-.5	-5.6	-.1	-1.1	-1.3
4000	-.8	-5.8	-.2	-1.7	-1.7
5000	-.8	-5.9	-.2	-.3	-1.6
6000	.9	-6.0	-.1	-.7	1.8
8000	1.9	-6.1	-.1	.3	3.0
10000	.8	-6.1	-.2	2.3	1.2
15000	1.4	-6.2	-.2	-.6	1.8
20000	-.3	-6.2	-.2	-1.5	-.3
30000	-.4	-6.3	-.2	-1.5	-.4
40000	.5	-6.4	-.2	-.9	.5
50000	.1	-6.3	-.2	-.1	.1
60000	.9	-5.7	-.2	.6	1.0
80000	1.4	-4.4	-.2	2.0	1.4
100000	1.0	-2.8	-.2	3.3	1.1

Z= 72 HAFNIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-20.3	-.5	1.5	-20.3
1.5	-9.1	-.6	1.5	-9.1
2	-7.8	-.7	2.0	-7.8
3	-17.9	-1.0	1.7	-18.0
4	-12.4	-1.3	1.1	-12.5
5	-8.2	-1.4	.7	-8.3
6	-5.0	-1.4	.5	-5.1
8	-1.8	-1.5	.5	-1.8
10	8.7	-1.8	-1.3	8.9
15	.9	-1.8	-1.6	1.0
20	-1.2	-1.7	-1.4	-1.2
30	-2.7	-2.2	-.4	-2.7
40	-2.1	-5.2	.0	-1.9
50	-.9	-7.6	.1	-.1
60	.6	-9.2	.1	2.1
80	-1.4	-8.2	-.5	-1.2
100	-.9	-8.8	.4	-.6
150	.4	-9.5	-.3	1.1
200	1.3	-9.3	-.3	2.4
300	1.7	-8.6	-.2	3.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.4	-7.8	-.1	3.9	
500	1.0	-7.2	-.0	3.5	
600	.5	-6.5	-.0	2.7	
800	-.2	-5.8	.0	.1	
1000	-.8	-4.7	.0	-3.8	
1500	-.9	-5.5	-.0	-6.5	-2.3
2000	-.4	-5.8	-.0	-3.4	-.8
3000	-.7	-6.2	-.1	-3.6	-1.9
4000	-.4	-6.4	-.2	-4.1	-.4
5000	.2	-6.5	-.2	-2.7	.6
6000	2.2	-6.6	-.2	-3.1	4.3
8000	3.2	-6.7	-.2	-2.0	5.0
10000	1.4	-6.7	-.2	-.1	1.9
15000	.3	-6.8	-.2	-3.0	.4
20000	-1.4	-6.8	-.2	-3.9	-1.6
30000	-.1	-6.9	-.2	-4.0	-.1
40000	1.1	-7.0	-.2	-3.4	1.2
50000	.3	-6.9	-.2	-2.7	.4
60000	.8	-6.3	-.2	-2.0	.8
80000	.9	-5.0	-.2	-.6	.9
100000	1.1	-3.5	-.2	.6	1.1

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 73 TANTALUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-23.4	-.5	1.2	-23.4
1.5	-8.4	-.6	.7	-8.5
2	-5.0	-.7	1.4	-5.0
3	-15.9	-1.0	1.9	-15.9
4	-9.7	-1.3	1.5	-9.8
5	-6.3	-1.4	1.0	-6.3
6	-4.1	-1.4	.7	-4.1
8	-1.1	-1.5	.5	-1.1
10	4.1	-1.7	-1.2	4.2
15	-.1	-1.6	-1.4	-.1
20	.7	-1.6	-1.1	.8
30	-.3	-2.5	-.3	-.2
40	-1.4	-5.9	.1	-1.0
50	-2.0	-8.5	.2	-1.3
60	-2.1	-10.4	.1	-1.0
80	.9	-9.4	-.5	1.4
100	.9	-10.2	.4	1.4
150	.9	-11.0	-.3	1.8
200	1.1	-10.9	-.3	2.2
300	1.2	-10.2	-.2	3.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.2	-9.5	-.1	3.5	
500	1.1	-9.0	-.0	3.9	
600	1.0	-8.3	-.0	4.2	
800	.6	-7.5	-.0	3.7	
1000	.2	-6.7	.0	2.0	
1500	-.3	-7.4	-.0	-1.0	-3.2
2000	.2	-7.7	-.0	2.1	1.3
3000	-.5	-8.1	-.1	1.9	-1.8
4000	-.8	-8.3	-.2	1.3	-1.7
5000	-.7	-8.4	-.2	2.9	-1.4
6000	1.0	-8.5	-.2	2.5	1.9
8000	1.9	-8.6	-.2	3.6	2.9
10000	.4	-8.7	-.2	5.7	.6
15000	.4	-8.8	-.2	2.6	.5
20000	-1.2	-8.8	-.2	1.7	-1.3
30000	-.4	-8.8	-.2	1.6	-.4
40000	.9	-9.0	-.2	2.2	.9
50000	.6	-8.8	-.2	3.0	.6
60000	1.4	-8.3	-.2	3.7	1.4
80000	1.7	-7.0	-.2	5.2	1.7
100000	1.4	-5.5	-.2	6.4	1.4

Z= 74 TUNGSTEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-20.2	-.5	4.2	-20.2
1.5	-9.8	-.6	1.9	-9.8
2	1.4	-.7	1.5	1.4
3	-12.8	-1.0	1.1	-12.9
4	-7.9	-1.2	.7	-8.0
5	-5.5	-1.4	.4	-5.5
6	-4.2	-1.4	.3	-4.2
8	-2.9	-1.5	.4	-3.0
10	-2.9	-1.7	-.9	-2.9
15	-3.5	-1.7	-1.4	-3.6
20	-3.0	-1.6	-1.3	-3.1
30	-2.7	-2.3	-.4	-2.7
40	-2.2	-5.5	-.0	-1.9
50	-1.5	-8.2	.1	-.3
60	-1.0	-9.9	.1	.3
80	-.0	-8.9	-.5	.3
100	-.5	-9.6	.4	-.2
150	-.7	-10.4	-.3	-.1
200	-.2	-10.3	-.3	.6
300	.7	-9.6	-.2	2.0

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.2	-8.8	-.1	3.3	
500	1.4	-8.3	-.0	4.4	
600	1.5	-7.5	-.0	5.4	
800	1.2	-6.8	-.0	6.1	
1000	.9	-5.9	.0	5.3	
1500	.1	-6.6	-.0	2.4	-2.7
2000	.5	-7.0	-.1	5.8	2.2
3000	-.1	-7.3	-.1	5.8	-.9
4000	-.3	-7.5	-.2	5.3	-.8
5000	-.3	-7.6	-.2	6.9	-.6
6000	1.4	-7.7	-.2	6.5	2.6
8000	2.2	-7.8	-.2	7.7	3.4
10000	.7	-7.9	-.2	9.9	1.0
15000	.8	-8.0	-.2	6.6	1.0
20000	-.5	-8.0	-.2	5.6	-.6
30000	.2	-8.1	-.2	5.5	.3
40000	1.2	-8.2	-.2	6.1	1.3
50000	.6	-8.1	-.2	6.9	.6
60000	1.2	-7.5	-.2	7.7	1.3
80000	1.4	-6.2	-.2	9.2	1.4
100000	1.2	-4.7	-.2	10.5	1.2

Z= 75 RHENIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-23.3	-.4	6.7	-23.4
1.5	-11.1	-.6	2.7	-11.2
2	-2.8	-.7	1.5	-2.8
3	-15.0	-1.1	.6	-15.0
4	-9.6	-1.2	.2	-9.6
5	-6.9	-1.3	.0	-6.9
6	-5.2	-1.3	.1	-5.3
8	-3.4	-1.4	.3	-3.5
10	-2.6	-1.6	.6	-2.7
15	-3.3	-1.6	.3	-3.3
20	-1.0	-1.6	-.0	-1.0
30	-.9	-2.3	-.1	-.8
40	-2.0	-5.6	.2	-1.7
50	-3.1	-8.3	.2	-2.5
60	-4.0	-10.2	.1	-3.3
80	-.6	-9.1	-.5	-.3
100	-2.5	-9.8	.4	-2.3
150	-3.1	-10.6	-.3	-2.8
200	-2.0	-10.5	-.3	-1.6
300	-.0	-9.9	-.2	1.1

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.7	-9.1	-.1	2.4	
500	.7	-8.6	-.0	2.7	
600	.4	-7.8	.0	2.3	
800	-.4	-7.2	.1	-.6	
1000	-1.3	-6.1	.0	-5.4	
1500	-1.2	-6.8	-.0	-7.7	-3.3
2000	-.3	-7.2	-.1	-4.6	2.5
3000	-.6	-7.6	-.1	-4.4	-1.1
4000	-.9	-7.8	-.3	-4.8	-1.4
5000	-.8	-7.9	-.2	-3.3	-1.3
6000	.8	-7.9	-.2	-3.7	1.8
8000	1.7	-8.0	-.2	-2.7	2.7
10000	.4	-8.1	-.2	-.8	.7
15000	1.2	-8.2	-.2	-3.8	1.5
20000	.2	-8.2	-.2	-4.7	.3
30000	.7	-8.3	-.2	-4.7	.8
40000	1.4	-8.4	-.2	-4.1	1.6
50000	.8	-8.3	-.2	-3.4	.8
60000	1.4	-7.8	-.2	-2.6	1.4
80000	1.6	-6.5	-.2	-1.2	1.7
100000	1.4	-5.0	-.2	.0	1.5

Z= 76 OSMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-22.3	-.4	15.3	-22.3
1.5	-14.0	-.6	8.3	-14.0
2	-7.8	-.8	4.9	-7.8
3	-12.8	-1.1	2.3	-12.9
4	-10.2	-1.2	1.2	-10.2
5	-7.1	-1.3	1.1	-7.2
6	-5.3	-1.3	.7	-5.3
8	-3.1	-1.4	.8	-3.1
10	-2.1	-1.6	-.7	-2.2
15	-1.0	-1.6	-1.6	-1.0
20	-.8	-1.6	-1.4	-.8
30	-1.7	-2.3	-.4	-1.7
40	-2.5	-5.7	-.0	-2.2
50	-2.8	-8.3	.1	-2.3
60	-3.0	-10.3	.0	-2.2
80	-2.5	-9.2	-.6	-2.3
100	-.2	-9.9	.4	.2
150	1.3	-10.7	-.3	2.1
200	1.1	-10.7	-.4	2.2
300	.1	-10.0	-.3	1.2

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.5	-9.3	-.1	.3	
500	-.6	-8.7	-.0	-.2	
600	-.5	-8.0	.0	-.4	
800	-.5	-7.3	-.1	-.6	
1000	-.4	-6.4	.0	-1.0	
1500	-.7	-7.1	-.0	-3.7	-3.1
2000	.0	-7.5	-.1	-.6	2.3
3000	-.4	-7.9	-.1	-.3	-1.0
4000	-.6	-8.1	-.3	-.7	-1.1
5000	-.5	-8.2	-.2	.8	-.9
6000	1.1	-8.3	-.2	.4	2.2
8000	1.8	-8.4	-.2	1.3	2.9
10000	.4	-8.4	-.2	3.3	.6
15000	.6	-8.5	-.2	.3	.8
20000	-.6	-8.5	-.2	-.5	-.7
30000	-.3	-8.6	-.3	-.5	-.3
40000	.4	-8.7	-.2	.3	.4
50000	-.3	-8.6	-.2	1.1	-.3
60000	.2	-8.1	-.2	1.9	.2
80000	.4	-6.8	-.3	3.5	.5
100000	.3	-5.4	-.3	4.9	.4

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 77 IRIDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-22.2	-.3	21.9	-22.2
1.5	-7.4	-.5	12.6	-7.4
2	.7	-.8	7.5	.7
3	-14.6	-1.1	3.5	-14.6
4	-11.4	-1.2	1.9	-11.4
5	-7.9	-1.3	1.8	-8.0
6	-6.0	-1.3	1.3	-6.1
8	-3.8	-1.4	1.2	-3.8
10	-2.3	-1.6	-.3	-2.3
15	.1	-1.7	-1.2	.1
20	-1.0	-1.6	-1.1	-1.0
30	-2.3	-2.2	-.4	-2.3
40	-2.1	-5.6	-.0	-1.8
50	-1.1	-8.3	.1	-.4
60	.2	-10.2	.0	1.5
80	-.8	-9.2	-.5	-.5
100	.7	-9.9	.4	1.2
150	1.4	-10.7	-.3	2.2
200	.9	-10.6	-.4	1.9
300	-.2	-10.0	-.3	.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.6	-9.2	-.1	.1	
500	-.6	-8.7	-.1	-.2	
600	-.5	-8.0	-.0	-.2	
800	-.4	-7.3	-.0	-.4	
1000	-.4	-6.4	.0	-1.0	
1500	-.7	-7.1	-.0	-3.8	-2.0
2000	-.2	-7.5	-.1	-.9	.1
3000	-.5	-7.9	-.1	-.5	-1.4
4000	-.3	-8.1	-.3	-.9	-.2
5000	.3	-8.2	-.2	.7	.8
6000	2.3	-8.3	-.2	.2	4.2
8000	3.1	-8.4	-.2	1.1	4.7
10000	1.2	-8.4	-.2	3.0	1.7
15000	.1	-8.5	-.2	.2	.2
20000	-1.4	-8.5	-.2	-.6	-1.6
30000	-.1	-8.6	-.3	-.4	-.0
40000	1.3	-8.7	-.3	.4	1.4
50000	.7	-8.6	-.3	1.4	.7
60000	1.1	-8.1	-.3	2.3	1.2
80000	1.1	-6.8	-.3	4.0	1.1
100000	1.0	-5.4	-.3	5.4	1.0

Z= 78 PLATINUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-20.0	-.2	15.5	-20.1
1.5	-7.0	-.5	6.8	-7.0
2	-.5	-.7	2.4	-.5
3	-14.7	-1.1	-.3	-14.8
4	-15.3	-1.2	-.6	-15.4
5	-10.7	-1.3	.1	-10.8
6	-7.5	-1.4	.2	-7.6
8	-3.1	-1.5	.9	-3.1
10	-.1	-1.6	-.2	-.0
15	-3.2	-1.6	-.9	-3.3
20	-.2	-1.6	-.9	-.1
30	.2	-2.2	-.3	.3
40	-.4	-5.5	.1	-.0
50	-.6	-8.1	.1	.2
60	-.2	-9.9	.1	1.0
80	-.6	-8.9	-.5	-.3
100	1.8	-9.6	.5	2.3
150	3.7	-10.3	-.3	4.7
200	3.7	-10.2	-.3	5.2
300	2.6	-9.5	-.3	4.6

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.5	-8.8	-.1	3.7	
500	.9	-8.3	-.0	2.9	
600	.5	-7.6	-.0	2.2	
800	-.1	-6.8	-.1	.8	
1000	-.4	-5.9	.0	-1.2	
1500	-.8	-6.6	-.0	-4.0	-3.6
2000	.1	-7.0	-.1	-1.1	3.6
3000	-.4	-7.4	-.2	-.6	-.8
4000	-.8	-7.6	-.3	-.9	-1.5
5000	-.8	-7.7	-.2	.7	-1.4
6000	.7	-7.8	-.2	.2	1.5
8000	1.5	-7.9	-.2	1.0	2.3
10000	.3	-8.0	-.2	2.9	.4
15000	.8	-8.1	-.3	.2	1.1
20000	-.7	-8.1	-.3	-.5	-.7
30000	-.8	-8.2	-.3	-.2	-.8
40000	.2	-8.3	-.3	.7	.2
50000	-.1	-8.2	-.3	1.7	-.1
60000	.8	-7.7	-.3	2.7	.8
80000	1.2	-6.4	-.3	4.5	1.2
100000	.6	-5.0	-.3	6.0	.6

Z= 79 GOLD

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-20.3	-.3	16.6	-20.4
1.5	-7.8	-.5	7.7	-7.9
2	-1.7	-.7	3.1	-1.8
3	-3.5	-1.0	.1	-3.5
4	-7.7	-1.1	-.1	-7.7
5	-5.4	-1.3	.1	-5.5
6	-4.5	-1.3	.4	-4.6
8	-4.0	-1.5	.7	-4.0
10	-3.7	-1.6	.7	-3.8
15	-1.4	-1.6	.3	-1.4
20	.3	-1.6	.2	.3
30	-.0	-2.1	.2	.1
40	-.7	-5.4	.3	-.4
50	-1.0	-7.9	.3	-.3
60	-.8	-9.7	.2	.3
80	.6	-8.7	-.5	2.2
100	.4	-9.3	.4	.8
150	.0	-10.1	-.3	.6
200	.2	-9.9	-.3	.9
300	.6	-9.3	-.2	1.7

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.8	-8.5	-.1	2.3	
500	.9	-8.0	-.0	2.9	
600	.9	-7.3	.0	3.0	
800	.2	-6.5	.0	1.5	
1000	-.5	-5.7	.1	-1.7	
1500	-.9	-6.5	.0	-4.6	-3.1
2000	.2	-6.9	-.0	-1.8	4.5
3000	-.3	-7.3	-.1	-1.3	-.5
4000	-.8	-7.5	-.2	-1.6	-1.5
5000	-.8	-7.6	-.2	-.0	-1.5
6000	.7	-7.7	-.2	-.6	1.3
8000	1.4	-7.8	-.2	.2	2.3
10000	.4	-7.8	-.2	2.0	.6
15000	1.3	-7.9	-.2	-.6	1.6
20000	-.2	-7.9	-.2	-1.2	-.2
30000	-.7	-8.0	-.2	-.8	-.8
40000	.0	-8.1	-.2	.2	.0
50000	-.3	-8.0	-.2	1.2	-.3
60000	.6	-7.6	-.2	2.3	.6
80000	1.0	-6.3	-.2	4.1	1.0
100000	.3	-4.9	-.2	5.7	.3

Z= 80 MERCURY

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-21.5	-.3	18.0	-21.5
1.5	-9.2	-.5	8.5	-9.2
2	-3.5	-.7	3.6	-3.5
3	-6.9	-1.0	-.4	-6.9
4	-10.3	-1.1	-1.1	-10.4
5	-7.3	-1.3	-.6	-7.3
6	-5.9	-1.3	.1	-5.9
8	-4.7	-1.4	.8	-4.8
10	-4.0	-1.5	.7	-4.1
15	-1.3	-1.5	.1	-1.3
20	.3	-1.6	-.1	.4
30	-.7	-2.1	.1	-.6
40	-1.9	-5.4	.2	-1.6
50	-2.4	-7.9	.2	-2.0
60	-2.4	-9.6	.2	-1.6
80	-1.0	-8.7	-.5	.2
100	1.3	-9.3	.5	1.7
150	6.7	-10.1	-.3	8.1
200	6.9	-9.9	-.4	9.1
300	4.4	-9.2	-.2	7.1

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.2	-8.5	-.1	4.7	
500	1.0	-8.0	-.0	2.9	
600	.3	-7.3	-.0	1.6	
800	-.3	-6.6	.0	-.3	
1000	-.6	-5.5	.1	-1.8	
1500	-.9	-6.3	.0	-4.6	-2.6
2000	.2	-6.7	-.0	-1.8	4.4
3000	-.3	-7.1	-.1	-1.1	-.6
4000	-.8	-7.3	-.2	-1.4	-1.5
5000	-.8	-7.4	-.2	.2	-1.3
6000	.8	-7.5	-.2	-.5	1.6
8000	1.7	-7.6	-.2	.2	2.7
10000	.8	-7.7	-.2	1.9	1.1
15000	1.8	-7.7	-.2	-.7	2.3
20000	.3	-7.8	-.2	-1.2	.4
30000	-.3	-7.8	-.2	-.7	-.3
40000	.4	-7.9	-.2	.3	.5
50000	.1	-7.9	-.2	1.4	.1
60000	1.0	-7.4	-.2	2.5	1.0
80000	1.2	-6.1	-.2	4.5	1.2
100000	.3	-4.7	-.2	6.1	.4

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 81 THALLIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-19.6	-.3	23.7	-19.7
1.5	-8.6	-.5	12.2	-8.6
2	-4.5	-.7	5.6	-4.5
3	-7.6	-1.0	-.1	-7.6
4	-11.2	-1.1	-1.2	-11.3
5	-7.4	-1.2	-.7	-7.5
6	-5.7	-1.3	.1	-5.7
8	-4.0	-1.4	.9	-4.1
10	-3.0	-1.5	.8	-3.1
15	-1.9	-1.4	.5	-1.9
20	-.8	-1.6	.2	-.8
30	-.6	-2.2	.0	-.5
40	-1.4	-5.6	.2	-1.1
50	-2.1	-8.3	.2	-1.5
60	-2.5	-10.1	.1	-1.7
80	-2.5	-9.2	-.5	-1.6
100	-1.7	-9.9	.5	-1.4
150	1.3	-10.7	-.3	2.0
200	1.4	-10.6	-.4	2.4
300	.3	-10.0	-.3	1.3

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.4	-9.2	-.1	.3	
500	-.6	-8.7	-.0	-.1	
600	-.5	-8.0	.0	-.2	
800	-.5	-7.3	-.0	-.4	
1000	-.4	-6.4	.1	-.8	
1500	-.8	-7.2	.0	-3.8	-3.0
2000	.2	-7.6	-.0	-1.1	4.5
3000	-.3	-8.0	-.1	-.3	-.5
4000	-.8	-8.2	-.3	-.5	-1.6
5000	-.8	-8.3	-.2	1.2	-1.5
6000	.6	-8.4	-.2	.5	1.2
8000	1.4	-8.5	-.2	1.1	2.1
10000	.4	-8.6	-.2	2.9	.6
15000	1.7	-8.7	-.2	.4	2.1
20000	.5	-8.7	-.2	-.0	.7
30000	.3	-8.8	-.2	.6	.3
40000	1.1	-8.9	-.2	1.8	1.1
50000	.7	-8.8	-.2	3.0	.8
60000	1.6	-8.3	-.2	4.1	1.7
80000	2.0	-7.1	-.2	6.2	2.1
100000	1.4	-5.7	-.2	8.0	1.5

Z= 82 LEAD

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-17.5	-.4	24.0	-17.6
1.5	-7.2	-.5	12.4	-7.2
2	-3.1	-.7	5.9	-3.1
3	6.2	-1.0	.3	6.2
4	-12.1	-1.1	-.6	-12.2
5	-8.8	-1.2	-.2	-8.9
6	-6.9	-1.3	.4	-7.0
8	-4.8	-1.3	1.0	-4.8
10	-3.5	-1.4	1.9	-3.6
15	-.8	-1.6	2.0	-.8
20	-.3	-1.5	1.5	-.2
30	.8	-2.3	.5	1.0
40	.5	-5.7	.4	9
50	.2	-8.2	.3	.9
60	.0	-9.9	.2	1.2
80	.6	-9.1	-.5	2.1
100	.8	-9.8	.5	1.2
150	.3	-10.5	-.3	.9
200	-.1	-10.4	-.4	.6
300	-.2	-9.7	-.3	.6

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.1	-9.1	-.1	1.0	
500	.4	-8.5	-.0	1.7	
600	.7	-7.8	.0	2.4	
800	.6	-7.1	.0	2.8	
1000	.4	-6.2	.1	2.2	
1500	-.3	-6.9	-.0	-.9	-1.6
2000	.4	-7.3	-.1	1.7	2.8
3000	-.2	-7.7	-.1	2.7	-.8
4000	-.5	-8.0	-.3	2.5	-.9
5000	-.1	-8.1	-.2	4.3	-.3
6000	1.5	-8.2	-.2	3.6	2.6
8000	2.0	-8.3	-.2	4.2	3.1
10000	.6	-8.3	-.2	5.9	.8
15000	.6	-8.4	-.2	3.5	.8
20000	-.7	-8.5	-.3	3.1	-.8
30000	-.5	-8.5	-.3	4.0	-.6
40000	.3	-8.6	-.3	5.2	.3
50000	-.2	-8.6	-.3	6.6	-.2
60000	.4	-8.1	-.3	7.8	.5
80000	.8	-6.9	-.3	10.1	.8
100000	.6	-5.5	-.3	12.0	.6

Z= 83 BISMUTH

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-22.0	-.3	26.0	-22.1
1.5	-9.3	-.5	12.9	-9.3
2	-3.8	-.6	5.3	-3.8
3	8.7	-1.0	-1.0	8.8
4	-12.1	-1.1	-1.8	-12.1
5	-8.3	-1.2	-1.0	-8.4
6	-6.6	-1.3	.1	-6.7
8	-5.5	-1.3	1.1	-5.6
10	-5.0	-1.4	.9	-5.1
15	1.2	-1.7	-.1	1.3
20	-.1	-1.5	-.1	-.0
30	-.1	-2.2	.2	-.0
40	-1.5	-5.3	.2	-1.2
50	-2.5	-7.6	.2	-2.1
60	-3.1	-9.1	.1	-2.5
80	-2.9	-8.3	-.5	-2.2
100	-2.4	-8.9	.5	-2.2
150	-.7	-9.5	-.4	-.3
200	-.4	-9.3	-.4	.1
300	-.4	-8.5	-.3	.1

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.3	-7.8	-.1	.3	
500	-.0	-7.2	-.0	.7	
600	.1	-6.6	-.0	1.1	
800	-.1	-5.8	.0	.3	
1000	-.6	-4.9	.1	-1.7	
1500	-1.0	-5.7	-.0	-4.5	-1.9
2000	.1	-6.1	-.1	-1.9	4.1
3000	-.3	-6.5	-.1	-1.2	-.3
4000	-.6	-6.7	-.3	-1.4	-.9
5000	-.3	-6.8	-.2	.3	-.5
6000	1.2	-6.9	-.2	-.5	2.3
8000	2.0	-7.0	-.2	.1	3.1
10000	.9	-7.1	-.2	1.7	1.3
15000	1.7	-7.2	-.3	-.8	2.1
20000	.4	-7.2	-.3	-1.2	.5
30000	-.0	-7.3	-.3	-.6	.0
40000	.6	-7.4	-.3	.5	.6
50000	.0	-7.4	-.3	1.7	.0
60000	.7	-6.9	-.3	2.9	.8
80000	1.0	-5.6	-.3	4.9	1.0
100000	.5	-4.3	-.3	6.7	.5

Z= 86 RADON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-11.3	-.3	27.6	-11.3
1.5	-5.6	-.4	13.5	-5.7
2	-3.9	-.6	5.7	-3.9
3	2.3	-1.0	-.6	2.3
4	-3.0	-1.1	-1.9	-3.0
5	-9.8	-1.1	-1.1	-9.9
6	-7.7	-1.2	.1	-7.7
8	-5.4	-1.2	1.3	-5.5
10	-4.3	-1.2	1.0	-4.4
15	2.7	-1.5	-.2	2.8
20	-1.3	-1.5	-.1	-1.3
30	-.5	-2.0	.2	-.4
40	-1.3	-4.4	.3	-1.1
50	-1.9	-5.9	.2	-1.6
60	-2.0	-6.8	.2	-1.6
80	-1.2	-6.2	-.6	-.6
100	-2.6	-6.6	.5	-2.4
150	.8	-6.8	-.4	1.2
200	1.0	-6.3	-.5	1.6
300	.1	-5.4	-.3	.6

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	-.4	-4.7	-.1	-.2	
500	-.5	-4.1	-.1	-.5	
600	-.4	-3.5	-.0	-.5	
800	-.3	-2.6	.0	-.5	
1000	-.3	-1.6	.0	-.9	
1500	-.8	-2.4	-.0	-3.4	-1.4
2000	.3	-2.9	-.1	-.6	4.3
3000	-.3	-3.3	-.2	-.5	-.5
4000	-.8	-3.5	-.3	-.6	-1.3
5000	-.7	-3.7	-.2	1.1	-1.2
6000	.8	-3.8	-.2	.3	1.6
8000	1.6	-3.9	-.2	.8	2.5
10000	.7	-4.0	-.3	2.3	1.0
15000	1.8	-4.0	-.3	-.6	2.2
20000	.8	-4.1	-.3	-1.3	.9
30000	.4	-4.1	-.3	-1.1	.5
40000	1.0	-4.3	-.3	-.2	1.1
50000	.5	-4.2	-.3	.8	.6
60000	1.4	-3.8	-.3	1.7	1.4
80000	1.7	-2.5	-.3	3.5	1.8
100000	1.2	-1.1	-.3	5.1	1.2

TABLE I - cont.

PHOTON CROSS SECTION COMPARISON

100*(BIGGS & LIGHTHILL/ENDFB - 1)

Z= 90 THORIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.0	-.6	78.9	2.0
1.5	-.7	-.6	45.8	-.7
2	-4.5	-.7	28.8	-4.5
3	-15.0	-1.0	10.0	-15.2
4	12.3	-1.1	2.0	12.4
5	-7.6	-1.0	.4	-7.7
6	-8.5	-1.1	.6	-8.6
8	-6.8	-1.1	1.7	-7.0
10	-6.3	-1.0	10.2	-6.5
15	-5.6	-.6	5.6	-5.9
20	-3.9	-1.5	4.6	-4.0
30	-.9	-1.6	3.0	-.9
40	-.3	-3.1	1.4	-.1
50	-.4	-3.9	.8	-.1
60	-.6	-4.4	.7	-.2
80	-1.0	-3.7	-.4	-.8
100	-1.7	-3.9	.7	-1.5
150	.7	-3.6	-.4	.9
200	1.1	-3.0	-.6	1.5
300	.8	-1.9	1.0	.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.1	-1.1	-.3	.3	
500	-.0	-.4	-.3	.2	
600	.0	.2	-.2	.2	
800	.5	1.1	1.2	-.5	
1000	-.7	2.0	-.2	-1.9	
1500	-1.1	1.1	-.3	-4.1	-.3
2000	.1	.7	-.3	-1.1	4.0
3000	-.5	.2	-.4	-1.9	-.2
4000	-.7	-.0	-.6	-2.0	-.7
5000	-.5	-.2	-.5	-.2	-.5
6000	1.1	-.3	-.5	-1.0	2.3
8000	2.0	-.4	-.5	-.7	3.2
10000	1.1	-.5	-.5	.9	1.6
15000	1.6	-.6	-.5	-2.5	2.1
20000	.6	-.6	-.5	-3.6	.8
30000	.4	-.7	-.6	-3.8	.5
40000	1.1	-.8	-.6	-3.3	1.2
50000	.5	-.8	-.6	-2.6	.6
60000	1.2	-.3	-.6	-1.8	1.3
80000	1.2	.9	-.6	-.4	1.3
100000	.4	2.4	-.6	.9	.4

Z= 92 URANIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	-8.6	-.5	85.4	-8.7
1.5	2.9	-.6	46.9	2.9
2	6.5	-.7	29.4	6.5
3	3.3	-1.0	8.4	3.3
4	20.7	-1.1	-1.6	20.9
5	5.7	-1.1	-3.5	5.7
6	-3.0	-1.2	-3.2	-3.0
8	-1.2	-1.3	-1.1	-1.2
10	-.8	-1.2	3.3	-.8
15	-.7	-1.3	7.1	-.7
20	2.1	-1.4	6.3	2.3
30	1.0	-1.5	4.2	1.1
40	-.1	-2.8	2.0	.0
50	-1.3	-3.5	1.1	-1.1
60	-2.1	-3.8	.9	-2.0
80	-2.5	-3.2	-.3	-2.5
100	-1.9	-3.3	.7	-1.9
150	-.4	-3.0	-.4	-.2
200	1.0	-2.3	-.6	1.3
300	1.5	-1.2	1.7	1.6

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.8	-.3	-.3	1.2	
500	.5	.4	-.4	1.0	
600	.3	1.0	-.3	.8	
800	.8	1.9	1.8	-.5	
1000	-1.0	2.9	-.3	-2.5	
1500	-1.3	2.0	-.4	-4.8	-.6
2000	-.2	1.5	-.4	-1.9	3.4
3000	-.8	1.0	-.5	-3.1	-.5
4000	-.9	.8	-.7	-3.2	-.9
5000	-.7	.6	-.6	-1.4	-.8
6000	.9	.5	-.6	-2.2	2.0
8000	1.7	.4	-.6	-1.8	2.8
10000	.8	.4	-.6	-.3	1.2
15000	1.2	.2	-.7	-3.9	1.5
20000	.2	.2	-.7	-5.1	.3
30000	.1	.1	-.7	-5.5	.2
40000	.9	.0	-.7	-5.1	1.0
50000	.3	.0	-.7	-4.5	.3
60000	1.0	.5	-.7	-3.8	1.1
80000	1.3	1.7	-.7	-2.6	1.3
100000	.8	3.1	-.7	-1.4	.8

Z= 94 PLUTONIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	4.0	-.5	103.2	4.0
1.5	8.7	-.6	54.2	8.7
2	2.9	-.7	33.8	2.9
3	-8.5	-1.0	7.8	-8.6
4	8.9	-1.1	-5.3	9.0
5	-3.0	-1.1	-7.8	-3.0
6	-10.8	-1.2	-7.6	-10.9
8	-7.5	-1.2	-4.4	-7.6
10	-6.1	-1.1	2.4	-6.3
15	-3.7	-.5	8.6	-4.0
20	1.9	-1.5	7.9	2.0
30	.2	-1.4	5.3	.3
40	.2	-2.5	2.4	.4
50	.1	-3.1	1.4	.3
60	.3	-3.4	1.1	.5
80	1.1	-2.7	-.2	1.5
100	2.4	-2.8	.8	3.1
150	.9	-2.3	-.4	1.2
200	2.6	-1.6	-.7	3.1
300	1.9	-.5	2.5	1.9

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	.3	.5	-.4	.5	
500	-.0	1.1	-.5	.2	
600	.0	1.8	-.4	.2	
800	1.3	2.7	2.5	-.2	
1000	-.5	3.6	-.4	-.8	
1500	-1.2	2.7	-.5	-3.9	.8
2000	-.4	2.3	-.6	-1.7	2.2
3000	-.8	1.8	-.6	-2.1	-.9
4000	-.8	1.6	-.8	-3.0	-.6
5000	-.5	1.4	-.7	-1.7	-.2
6000	1.2	1.3	-.7	-2.5	2.7
8000	2.0	1.2	-.7	-2.0	3.3
10000	.8	1.1	-.8	-.4	1.3
15000	.9	1.0	-.8	-3.3	1.2
20000	.5	1.0	-.8	-4.0	.6
30000	1.4	.9	-.8	-3.8	1.6
40000	2.4	.8	-.8	-2.9	2.6
50000	1.6	.8	-.8	-1.9	1.7
60000	2.3	1.2	-.8	-.9	2.4
80000	2.4	2.4	-.8	.9	2.5
100000	2.2	3.9	-.8	2.4	2.2

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 1 HYDROGEN

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.652-01	6.652-01	2.124-05	0.000
.015	4.808+06	6.652-01	4.769-05	4.808+06
.020	2.195+06	6.652-01	8.462-05	2.195+06
.030	6.966+05	6.651-01	1.897-04	6.966+05
.040	3.020+05	6.650-01	3.358-04	3.020+05
.050	1.564+05	6.649-01	5.227-04	1.564+05
.060	9.075+04	6.648-01	7.498-04	9.075+04
.080	3.797+04	6.645-01	1.322-03	3.797+04
.100	1.905+04	6.641-01	2.050-03	1.905+04
.150	5.356+03	6.628-01	4.520-03	5.356+03
.200	2.165+03	6.609-01	7.872-03	2.165+03
.300	5.958+02	6.558-01	1.698-02	5.951+02
.400	2.354+02	6.490-01	2.887-02	2.347+02
.500	1.136+02	6.405-01	4.307-02	1.129+02
.600	6.239+01	6.306-01	5.909-02	6.170+01
.800	2.432+01	6.070-01	9.462-02	2.362+01
1.000	1.193+01	5.796-01	1.316-01	1.122+01
1.500	3.619+00	5.006-01	2.152-01	2.903+00
2.000	1.806+00	4.163-01	2.854-01	1.105+00
3.000	9.456-01	2.741-01	3.935-01	2.780-01
4.000	7.603-01	1.870-01	4.698-01	1.035-01
5.000	7.054-01	1.354-01	5.216-01	4.834-02
6.000	6.812-01	1.007-01	5.545-01	2.601-02
8.000	6.564-01	6.081-02	5.858-01	9.788-03
10.000	6.460-01	4.122-02	6.002-01	4.575-03
15.000	6.303-01	1.922-02	6.099-01	1.133-03
20.000	6.191-01	1.119-02	6.075-01	4.158-04
30.000	5.986-01	5.069-03	5.934-01	1.021-04
40.000	5.800-01	2.871-03	5.771-01	3.807-05

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.629-01	1.844-03	5.610-01	1.776-05	
60.	5.461-01	1.283-03	5.448-01	9.524-06	
80.	5.170-01	7.231-04	5.163-01	3.560-06	
100.	4.927-01	4.632-04	4.923-01	1.659-06	
150.	4.437-01	2.061-04	4.435-01	4.225-07	
200.	4.067-01	1.160-04	4.066-01	1.640-07	
300.	3.536-01	5.158-05	3.535-01	4.520-08	
400.	3.167-01	2.902-05	3.167-01	1.903-08	
500.	2.891-01	1.857-05	2.891-01	1.018-08	
600.	2.674-01	1.290-05	2.674-01	6.332-09	
800.	2.348-01	7.256-06	2.348-01	3.206-09	
1000.	2.111-01	4.644-06	2.111-01	1.998-09	
1500.	1.716-01	2.064-06	1.715-01	9.428-10	4.397-05
2000.	1.465-01	1.161-06	1.463-01	5.930-10	1.840-04
3000.	1.156-01	5.161-07	1.151-01	3.315-10	5.548-04
4000.	9.692-02	2.903-07	9.595-02	2.277-10	9.708-04
5000.	8.424-02	1.858-07	8.284-02	1.729-10	1.396-03
6000.	7.503-02	1.290-07	7.321-02	1.391-10	1.815-03
8000.	6.248-02	7.257-08	5.988-02	9.993-11	2.604-03
10000.	5.429-02	4.645-08	5.098-02	7.790-11	3.307-03
15000.	4.238-02	2.064-08	3.770-02	5.018-11	4.682-03
20000.	3.589-02	1.161-08	3.024-02	3.699-11	5.650-03
30000.	2.903-02	5.161-09	2.199-02	2.424-11	7.036-03
40000.	2.554-02	2.903-09	1.746-02	1.803-11	8.083-03
50000.	2.348-02	1.858-09	1.456-02	1.435-11	8.917-03
60000.	2.214-02	1.290-09	1.254-02	1.192-11	9.599-03
80000.	2.054-02	7.257-10	9.879-03	8.900-12	1.066-02
100000.	1.967-02	4.645-10	8.196-03	7.102-12	1.147-02

Z= 2 HELIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	2.661+00	2.661+00	6.125-06	0.000
.015	2.661+00	2.661+00	1.378-05	0.000
.020	2.661+00	2.661+00	2.451-05	0.000
.030	5.402+06	2.661+00	5.515-05	5.402+06
.040	3.300+06	2.661+00	9.808-05	3.300+06
.050	2.044+06	2.660+00	1.533-04	2.044+06
.060	1.337+06	2.660+00	2.208-04	1.337+06
.080	6.591+05	2.660+00	3.927-04	6.591+05
.100	3.722+05	2.659+00	6.140-04	3.722+05
.150	1.239+05	2.658+00	1.383-03	1.239+05
.200	5.448+04	2.655+00	2.463-03	5.448+04
.300	1.644+04	2.648+00	5.556-03	1.644+04
.400	6.877+03	2.638+00	9.904-03	6.874+03
.500	3.464+03	2.625+00	1.552-02	3.461+03
.600	1.970+03	2.609+00	2.240-02	1.967+03
.800	8.083+02	2.570+00	4.004-02	8.057+02
1.000	4.042+02	2.520+00	6.289-02	4.016+02
1.500	1.117+02	2.355+00	1.412-01	1.092+02
2.000	4.430+01	2.152+00	2.410-01	4.191+01
3.000	1.254+01	1.734+00	4.585-01	1.035+01
4.000	5.797+00	1.373+00	6.406-01	3.783+00
5.000	3.617+00	1.079+00	7.789-01	1.759+00
6.000	2.661+00	8.529-01	8.817-01	9.462-01
8.000	1.931+00	5.603-01	1.013+00	3.582-01
10.000	1.651+00	3.925-01	1.090+00	1.693-01
15.000	1.399+00	1.955-01	1.160+00	4.339-02
20.000	1.308+00	1.158-01	1.176+00	1.644-02
30.000	1.224+00	5.390-02	1.166+00	4.222-03
40.000	1.171+00	3.082-02	1.138+00	1.634-03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.128+00	1.988-02	1.107+00	7.873-04	
60.	1.089+00	1.387-02	1.074+00	4.352-04	
80.	1.039+00	7.836-03	1.031+00	1.718-04	
100.	9.883-01	5.027-03	9.832-01	8.404-05	
150.	8.889-01	2.240-03	8.867-01	2.323-05	
200.	8.143-01	1.261-03	8.130-01	9.419-06	
300.	7.077-01	5.609-04	7.071-01	2.710-06	
400.	6.337-01	3.156-04	6.334-01	1.167-06	
500.	5.784-01	2.021-04	5.782-01	6.343-07	
600.	5.349-01	1.403-04	5.348-01	4.009-07	
800.	4.697-01	7.895-05	4.697-01	2.084-07	
1000.	4.223-01	5.053-05	4.222-01	1.323-07	
1500.	3.433-01	2.246-05	3.431-01	6.369-08	1.775-04
2000.	2.934-01	1.264-05	2.927-01	4.020-08	7.138-04
3000.	2.323-01	5.616-06	2.302-01	2.233-08	2.138-03
4000.	1.956-01	3.159-06	1.919-01	1.521-08	3.659-03
5000.	1.708-01	2.022-06	1.657-01	1.146-08	5.126-03
6000.	1.529-01	1.404-06	1.464-01	9.164-09	6.490-03
8000.	1.286-01	7.898-07	1.198-01	6.521-09	8.876-03
10000.	1.128-01	5.055-07	1.020-01	5.051-09	1.086-02
15000.	9.014-02	2.247-07	7.540-02	3.222-09	1.473-02
20000.	7.831-02	1.264-07	6.048-02	2.363-09	1.783-02
30000.	6.649-02	5.616-08	4.398-02	1.539-09	2.251-02
40000.	6.054-02	3.159-08	3.492-02	1.141-09	2.562-02
50000.	5.696-02	2.022-08	2.913-02	9.067-10	2.783-02
60000.	5.465-02	1.404-08	2.508-02	7.521-10	2.957-02
80000.	5.220-02	7.898-09	1.976-02	5.608-10	3.244-02
100000.	5.142-02	5.055-09	1.639-02	4.470-10	3.503-02

Z= 3 LITHIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.322+06	5.987+00	5.314-05	1.322+06
.015	8.276+05	5.986+00	1.193-04	8.276+05
.020	5.290+05	5.986+00	2.117-04	5.290+05
.030	2.518+05	5.985+00	4.743-04	2.518+05
.040	1.385+05	5.983+00	8.396-04	1.385+05
.050	8.313+04	5.981+00	1.306-03	8.313+04
.060	4.137+06	5.979+00	1.873-03	4.137+06
.080	2.662+06	5.973+00	3.302-03	2.662+06
.100	1.646+06	5.965+00	5.116-03	1.646+06
.150	6.005+05	5.940+00	1.126-02	6.005+05
.200	2.775+05	5.905+00	1.959-02	2.775+05
.300	8.953+04	5.811+00	4.209-02	8.952+04
.400	3.933+04	5.688+00	7.133-02	3.933+04
.500	2.061+04	5.543+00	1.060-01	2.060+04
.600	1.209+04	5.381+00	1.447-01	1.208+04
.800	5.161+03	5.028+00	2.293-01	5.156+03
1.000	2.633+03	4.673+00	3.147-01	2.628+03
1.500	7.498+02	3.939+00	4.928-01	7.453+02
2.000	3.002+02	3.404+00	6.248-01	2.961+02
3.000	8.101+01	2.686+00	8.072-01	7.752+01
4.000	3.267+01	2.214+00	9.549-01	2.951+01
5.000	1.700+01	1.882+00	1.087+00	1.403+01
6.000	1.048+01	1.610+00	1.202+00	7.663+00
8.000	5.523+00	1.181+00	1.387+00	2.955+00
10.000	3.802+00	8.793-01	1.514+00	1.409+00
15.000	2.507+00	4.816-01	1.662+00	3.640-01
20.000	2.140+00	2.853-01	1.717+00	1.383-01
30.000	1.901+00	1.387-01	1.727+00	3.550-02
40.000	1.792+00	8.074-02	1.698+00	1.359-02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.719+00	5.260-02	1.660+00	6.449-03	
60.	1.659+00	3.692-02	1.618+00	3.504-03	
80.	1.564+00	2.102-02	1.541+00	1.337-03	
100.	1.486+00	1.354-02	1.471+00	6.367-04	
150.	1.335+00	6.066-03	1.329+00	1.708-04	
200.	1.223+00	3.425-03	1.219+00	6.909-05	
300.	1.062+00	1.527-03	1.061+00	2.022-05	
400.	9.511-01	8.607-04	9.502-01	8.832-06	
500.	8.680-01	5.514-04	8.674-01	4.799-06	
600.	8.027-01	3.831-04	8.023-01	3.012-06	
800.	7.048-01	2.157-04	7.045-01	1.554-06	
1000.	6.335-01	1.381-04	6.333-01	9.831-07	
1500.	5.151-01	6.142-05	5.146-01	4.724-07	4.017-04
2000.	4.406-01	3.456-05	4.391-01	2.983-07	1.527-03
3000.	3.499-01	1.536-05	3.452-01	1.659-07	4.669-03
4000.	2.959-01	8.643-06	2.879-01	1.131-07	8.037-03
5000.	2.598-01	5.532-06	2.485-01	8.525-08	1.123-02
6000.	2.338-01	3.842-06	2.196-01	6.821-08	1.412-02
8000.	1.986-01	2.161-06	1.796-01	4.857-08	1.894-02
10000.	1.756-01	1.383-06	1.529-01	3.763-08	2.267-02
15000.	1.426-01	6.148-07	1.131-01	2.402-08	2.947-02
20000.	1.260-01	3.459-07	9.073-02	1.762-08	3.528-02
30000.	1.111-01	1.537-07	6.598-02	1.148-08	4.513-02
40000.	1.041-01	8.647-08	5.238-02	8.513-09	5.173-02
50000.	9.982-02	5.534-08	4.369-02	6.764-09	5.614-02
60000.	9.702-02	3.843-08	3.762-02	5.610-09	5.941-02
80000.	9.424-02	2.162-08	2.964-02	4.183-09	6.461-02
100000.	9.396-02	1.384-08	2.459-02	3.335-09	6.937-02

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 4 BERYLLIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.489+06	1.064+01	8.796-05	1.489+06
.015	1.697+06	1.064+01	1.975-04	1.697+06
.020	1.379+06	1.064+01	3.504-04	1.379+06
.030	8.248+05	1.064+01	7.849-04	8.248+05
.040	5.201+05	1.064+01	1.389-03	5.201+05
.050	3.495+05	1.064+01	2.162-03	3.495+05
.060	2.470+05	1.063+01	3.099-03	2.470+05
.080	1.373+05	1.063+01	5.462-03	1.373+05
.100	8.390+04	1.062+01	8.460-03	8.389+04
.150	1.419+06	1.058+01	1.861-02	1.419+06
.200	7.129+05	1.054+01	3.235-02	7.128+05
.300	2.494+05	1.041+01	6.942-02	2.494+05
.400	1.149+05	1.024+01	1.175-01	1.149+05
.500	6.240+04	1.005+01	1.742-01	6.239+04
.600	3.773+04	9.819+00	2.375-01	3.772+04
.800	1.694+04	9.307+00	3.746-01	1.693+04
1.000	8.966+03	8.759+00	5.111-01	8.956+03
1.500	2.679+03	7.430+00	7.840-01	2.671+03
2.000	1.099+03	6.233+00	9.698-01	1.092+03
3.000	3.023+02	4.442+00	1.189+00	2.966+02
4.000	1.202+02	3.438+00	1.348+00	1.154+02
5.000	5.996+01	2.881+00	1.485+00	5.559+01
6.000	3.475+01	2.473+00	1.603+00	3.067+01
8.000	1.567+01	1.871+00	1.791+00	1.201+01
10.000	9.175+00	1.453+00	1.931+00	5.792+00
15.000	4.487+00	8.250-01	2.137+00	1.525+00
20.000	3.348+00	5.278-01	2.234+00	5.857-01
30.000	2.691+00	2.659-01	2.273+00	1.518-01
40.000	2.465+00	1.574-01	2.250+00	5.819-02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.342+00	1.035-01	2.211+00	2.756-02	
60.	2.254+00	7.310-02	2.166+00	1.492-02	
80.	2.096+00	4.194-02	2.048+00	5.636-03	
100.	1.987+00	2.714-02	1.957+00	2.656-03	
150.	1.782+00	1.224-02	1.769+00	7.041-04	
200.	1.631+00	6.930-03	1.624+00	2.848-04	
300.	1.416+00	3.100-03	1.413+00	8.407-05	
400.	1.268+00	1.750-03	1.266+00	3.693-05	
500.	1.157+00	1.122-03	1.156+00	2.004-05	
600.	1.070+00	7.800-04	1.069+00	1.253-05	
800.	9.397-01	4.395-04	9.392-01	6.432-06	
1000.	8.446-01	2.815-04	8.444-01	4.059-06	
1500.	6.870-01	1.253-04	6.861-01	1.948-06	7.044-04
2000.	5.884-01	7.051-05	5.854-01	1.230-06	2.943-03
3000.	4.684-01	3.136-05	4.603-01	6.846-07	8.105-03
4000.	3.972-01	1.764-05	3.838-01	4.670-07	1.338-02
5000.	3.498-01	1.129-05	3.314-01	3.522-07	1.847-02
6000.	3.161-01	7.844-06	2.929-01	2.819-07	2.326-02
8000.	2.714-01	4.413-06	2.395-01	2.008-07	3.186-02
10000.	2.431-01	2.825-06	2.039-01	1.557-07	3.916-02
15000.	2.035-01	1.256-06	1.508-01	9.938-08	5.272-02
20000.	1.830-01	7.063-07	1.210-01	7.291-08	6.201-02
30000.	1.632-01	3.139-07	8.797-02	4.753-08	7.525-02
40000.	1.548-01	1.766-07	6.984-02	3.525-08	8.499-02
50000.	1.508-01	1.130-07	5.825-02	2.800-08	9.252-02
60000.	1.487-01	7.848-08	5.016-02	2.323-08	9.855-02
80000.	1.473-01	4.415-08	3.952-02	1.732-08	1.078-01
100000.	1.476-01	2.825-08	3.279-02	1.381-08	1.149-01

Z= 5 BORON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.303+06	1.663+01	8.355-05	6.303+06
.015	4.622+06	1.663+01	1.876-04	4.622+06
.020	3.524+06	1.663+01	3.329-04	3.524+06
.030	2.077+06	1.663+01	7.459-04	2.077+06
.040	1.321+06	1.663+01	1.321-03	1.321+06
.050	9.000+05	1.662+01	2.055-03	9.000+05
.060	6.464+05	1.662+01	2.948-03	6.463+05
.080	3.725+05	1.661+01	5.197-03	3.725+05
.100	2.373+05	1.660+01	8.054-03	2.373+05
.150	9.875+04	1.656+01	1.775-02	9.873+04
.200	1.413+06	1.651+01	3.088-02	1.413+06
.300	5.257+05	1.637+01	6.647-02	5.257+05
.400	2.573+05	1.619+01	1.128-01	2.573+05
.500	1.462+05	1.596+01	1.679-01	1.462+05
.600	9.112+04	1.570+01	2.298-01	9.111+04
.800	4.168+04	1.508+01	3.660-01	4.167+04
1.000	2.202+04	1.439+01	5.054-01	2.200+04
1.500	6.703+03	1.252+01	8.078-01	6.690+03
2.000	2.830+03	1.063+01	1.047+00	2.818+03
3.000	8.211+02	7.527+00	1.394+00	8.122+02
4.000	3.374+02	5.654+00	1.649+00	3.301+02
5.000	1.694+02	4.545+00	1.844+00	1.630+02
6.000	9.689+01	3.772+00	1.990+00	9.112+01
8.000	4.102+01	2.785+00	2.193+00	3.605+01
10.000	2.191+01	2.192+00	2.344+00	1.737+01
15.000	8.395+00	1.305+00	2.596+00	4.494+00
20.000	5.277+00	8.499-01	2.728+00	1.699+00
30.000	3.669+00	4.364-01	2.795+00	4.376-01
40.000	3.206+00	2.610-01	2.776+00	1.691-01

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.983+00	1.728-01	2.729+00	8.117-02	
60.	2.839+00	1.226-01	2.672+00	4.459-02	
80.	2.641+00	7.074-02	2.553+00	1.729-02	
100.	2.496+00	4.595-02	2.442+00	8.252-03	
150.	2.232+00	2.081-02	2.209+00	2.186-03	
200.	2.040+00	1.182-02	2.028+00	8.753-04	
300.	1.771+00	5.300-03	1.765+00	2.527-04	
400.	1.585+00	2.994-03	1.582+00	1.098-04	
500.	1.447+00	1.922-03	1.445+00	5.991-05	
600.	1.338+00	1.337-03	1.336+00	3.778-05	
800.	1.175+00	7.536-04	1.174+00	1.951-05	
1000.	1.056+00	4.829-04	1.055+00	1.231-05	
1500.	8.590-01	2.150-04	8.576-01	5.868-06	1.110-03
2000.	7.361-01	1.210-04	7.317-01	3.688-06	4.293-03
3000.	5.881-01	5.385-05	5.754-01	2.044-06	1.264-02
4000.	5.012-01	3.030-05	4.797-01	1.392-06	2.137-02
5000.	4.438-01	1.940-05	4.142-01	1.050-06	2.959-02
6000.	4.031-01	1.347-05	3.661-01	8.404-07	3.702-02
8000.	3.488-01	7.580-06	2.994-01	5.989-07	4.938-02
10000.	3.138-01	4.852-06	2.549-01	4.644-07	5.893-02
15000.	2.644-01	2.157-06	1.885-01	2.968-07	7.594-02
20000.	2.410-01	1.213-06	1.512-01	2.178-07	8.975-02
30000.	2.229-01	5.393-07	1.100-01	1.421-07	1.129-01
40000.	2.161-01	3.034-07	8.730-02	1.054-07	1.288-01
50000.	2.124-01	1.942-07	7.281-02	8.380-08	1.396-01
60000.	2.105-01	1.348-07	6.269-02	6.952-08	1.478-01
80000.	2.103-01	7.585-08	4.940-02	5.186-08	1.609-01
100000.	2.137-01	4.854-08	4.098-02	4.135-08	1.727-01

Z= 6 CARBON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.474+07	2.395+01	6.049-05	1.474+07
.015	8.023+06	2.395+01	1.359-04	8.023+06
.020	6.444+06	2.395+01	2.411-04	6.444+06
.030	4.117+06	2.394+01	5.407-04	4.117+06
.040	2.723+06	2.394+01	9.578-04	2.723+06
.050	1.896+06	2.394+01	1.491-03	1.896+06
.060	1.380+06	2.394+01	2.140-03	1.380+06
.080	8.068+05	2.393+01	3.778-03	8.068+05
.100	5.177+05	2.392+01	5.861-03	5.176+05
.150	2.162+05	2.388+01	1.295-02	2.161+05
.200	1.086+05	2.383+01	2.261-02	1.086+05
.300	9.129+05	2.368+01	4.899-02	9.129+05
.400	4.795+05	2.349+01	8.375-02	4.795+05
.500	2.788+05	2.325+01	1.256-01	2.788+05
.600	1.755+05	2.297+01	1.734-01	1.755+05
.800	8.162+04	2.229+01	2.817-01	8.160+04
1.000	4.392+04	2.150+01	3.985-01	4.390+04
1.500	1.381+04	1.917+01	6.883-01	1.379+04
2.000	5.970+03	1.662+01	9.644-01	5.953+03
3.000	1.794+03	1.215+01	1.453+00	1.780+03
4.000	7.529+02	9.170+00	1.829+00	7.419+02
5.000	3.811+02	7.221+00	2.106+00	3.718+02
6.000	2.180+02	5.841+00	2.306+00	2.098+02
8.000	9.059+01	4.159+00	2.562+00	8.387+01
10.000	4.661+01	3.230+00	2.744+00	4.064+01
15.000	1.560+01	1.981+00	3.045+00	1.058+01
20.000	8.520+00	1.288+00	3.207+00	4.025+00
30.000	5.037+00	6.758-01	3.309+00	1.052+00
40.000	4.125+00	4.122-01	3.302+00	4.102-01

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	3.729+00	2.767-01	3.254+00	1.982-01	
60.	3.495+00	1.983-01	3.187+00	1.093-01	
80.	3.214+00	1.160-01	3.055+00	4.261-02	
100.	3.021+00	7.595-02	2.925+00	2.035-02	
150.	2.690+00	3.480-02	2.650+00	5.371-03	
200.	2.456+00	1.988-02	2.434+00	2.142-03	
300.	2.129+00	8.968-03	2.119+00	6.156-04	
400.	1.905+00	5.083-03	1.899+00	2.678-04	
500.	1.738+00	3.268-03	1.734+00	1.468-04	
600.	1.606+00	2.276-03	1.604+00	9.299-05	
800.	1.410+00	1.285-03	1.409+00	4.809-05	
1000.	1.267+00	8.243-04	1.267+00	3.027-05	
1500.	1.031+00	3.674-04	1.029+00	1.435-05	1.582-03
2000.	8.847-01	2.070-04	8.781-01	8.982-06	6.357-03
3000.	7.087-01	9.214-05	6.905-01	4.962-06	1.817-02
4000.	6.060-01	5.187-05	5.757-01	3.378-06	3.027-02
5000.	5.387-01	3.321-05	4.971-01	2.547-06	4.163-02
6000.	4.913-01	2.307-05	4.393-01	2.040-06	5.196-02
8000.	4.287-01	1.298-05	3.593-01	1.455-06	6.942-02
10000.	3.892-01	8.310-06	3.059-01	1.129-06	8.327-02
15000.	3.348-01	3.694-06	2.262-01	7.223-07	1.085-01
20000.	3.096-01	2.078-06	1.815-01	5.306-07	1.282-01
30000.	2.909-01	9.238-07	1.320-01	3.465-07	1.589-01
40000.	2.844-01	5.197-07	1.048-01	2.571-07	1.796-01
50000.	2.813-01	3.326-07	8.738-02	2.044-07	1.940-01
60000.	2.802-01	2.310-07	7.523-02	1.696-07	2.050-01
80000.	2.821-01	1.299-07	5.927-02	1.266-07	2.228-01
100000.	2.879-01	8.316-08	4.918-02	1.009-07	2.387-01

TABLE 11, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 7 NITROGEN

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.729+07	3.259+01	3.820-05	1.729+07
.015	1.116+07	3.259+01	8.585-05	1.116+07
.020	9.950+06	3.259+01	1.524-04	9.950+06
.030	6.778+06	3.259+01	3.421-04	6.778+06
.040	4.589+06	3.259+01	6.067-04	4.589+06
.050	3.239+06	3.259+01	9.455-04	3.239+06
.060	2.381+06	3.258+01	1.358-03	2.381+06
.080	1.415+06	3.258+01	2.402-03	1.415+06
.100	9.207+05	3.257+01	3.734-03	9.207+05
.150	3.986+05	3.253+01	8.295-03	3.985+05
.200	2.089+05	3.248+01	1.455-02	2.089+05
.300	7.500+04	3.234+01	3.189-02	7.497+04
.400	3.091+04	3.215+01	5.517-02	3.088+04
.500	4.409+05	3.191+01	8.381-02	4.409+05
.600	2.839+05	3.162+01	1.173-01	2.838+05
.800	1.393+05	3.091+01	1.963-01	1.393+05
1.000	7.781+04	3.005+01	2.877-01	7.778+04
1.500	2.546+04	2.737+01	5.489-01	2.544+04
2.000	1.118+04	2.427+01	8.380-01	1.116+04
3.000	3.402+03	1.849+01	1.416+00	3.382+03
4.000	1.436+03	1.423+01	1.886+00	1.420+03
5.000	7.290+02	1.118+01	2.241+00	7.156+02
6.000	4.179+02	8.951+00	2.505+00	4.065+02
8.000	1.735+02	6.209+00	2.857+00	1.645+02
10.000	8.845+01	4.707+00	3.099+00	8.064+01
15.000	2.785+01	2.836+00	3.465+00	2.155+01
20.000	1.387+01	1.865+00	3.661+00	8.347+00
30.000	6.999+00	9.828-01	3.802+00	2.214+00
40.000	5.282+00	6.023-01	3.813+00	8.673-01

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	4.593+00	4.058-01	3.768+00	4.189-01	
60.	4.222+00	2.916-01	3.700+00	2.307-01	
80.	3.809+00	1.711-01	3.549+00	8.947-02	
100.	3.558+00	1.123-01	3.403+00	4.263-02	
150.	3.147+00	5.163-02	3.084+00	1.127-02	
200.	2.868+00	2.953-02	2.834+00	4.515-03	
300.	2.484+00	1.335-02	2.469+00	1.309-03	
400.	2.222+00	7.569-03	2.214+00	5.721-04	
500.	2.027+00	4.869-03	2.022+00	3.134-04	
600.	1.874+00	3.392-03	1.870+00	1.980-04	
800.	1.645+00	1.916-03	1.643+00	1.021-04	
1000.	1.479+00	1.229-03	1.477+00	6.415-05	
1500.	1.203+00	5.482-04	1.201+00	3.036-05	2.125-03
2000.	1.034+00	3.089-04	1.024+00	1.900-05	9.092-03
3000.	8.301-01	1.375-04	8.055-01	1.050-05	2.446-02
4000.	7.115-01	7.741-05	6.716-01	7.150-06	3.974-02
5000.	6.342-01	4.957-05	5.799-01	5.393-06	5.426-02
6000.	5.804-01	3.443-05	5.125-01	4.319-06	6.785-02
8000.	5.112-01	1.938-05	4.192-01	3.081-06	9.202-02
10000.	4.692-01	1.240-05	3.569-01	2.391-06	1.124-01
15000.	4.137-01	5.515-06	2.639-01	1.530-06	1.497-01
20000.	3.866-01	3.102-06	2.117-01	1.124-06	1.749-01
30000.	3.644-01	1.379-06	1.539-01	7.342-07	2.104-01
40000.	3.590-01	7.758-07	1.222-01	5.450-07	2.368-01
50000.	3.592-01	4.965-07	1.019-01	4.333-07	2.573-01
60000.	3.615-01	3.448-07	8.777-02	3.596-07	2.737-01
80000.	3.679-01	1.940-07	6.915-02	2.683-07	2.987-01
100000.	3.748-01	1.241-07	5.737-02	2.139-07	3.174-01

Z= 8 OXYGEN

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	4.747+07	4.257+01	2.371-05	4.747+07
.015	1.021+07	4.257+01	5.331-05	1.021+07
.020	1.040+07	4.257+01	9.474-05	1.039+07
.030	8.871+06	4.257+01	2.130-04	8.871+06
.040	6.592+06	4.257+01	3.782-04	6.592+06
.050	4.890+06	4.257+01	5.904-04	4.890+06
.060	3.711+06	4.256+01	8.494-04	3.711+06
.080	2.295+06	4.255+01	1.507-03	2.295+06
.100	1.532+06	4.254+01	2.350-03	1.532+06
.150	6.934+05	4.251+01	5.263-03	6.933+05
.200	3.770+05	4.246+01	9.311-03	3.770+05
.300	1.466+05	4.232+01	2.075-02	1.466+05
.400	6.801+04	4.213+01	3.653-02	6.797+04
.500	3.356+04	4.189+01	5.651-02	3.352+04
.600	4.341+05	4.160+01	8.057-02	4.341+05
.800	2.165+05	4.087+01	1.404-01	2.165+05
1.000	1.218+05	3.996+01	2.148-01	1.217+05
1.500	4.084+04	3.701+01	4.560-01	4.081+04
2.000	1.837+04	3.347+01	7.520-01	1.834+04
3.000	5.800+03	2.648+01	1.388+00	5.772+03
4.000	2.493+03	2.086+01	1.928+00	2.471+03
5.000	1.275+03	1.650+01	2.351+00	1.256+03
6.000	7.343+02	1.323+01	2.680+00	7.184+02
8.000	3.060+02	9.107+00	3.138+00	2.937+02
10.000	1.554+02	6.793+00	3.450+00	1.452+02
15.000	4.728+01	3.970+00	3.885+00	3.943+01
20.000	2.218+01	2.619+00	4.111+00	1.545+01
30.000	9.842+00	1.403+00	4.292+00	4.147+00
40.000	6.822+00	8.691-01	4.320+00	1.633+00

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.659+00	5.895-01	4.279+00	7.910-01	
60.	5.068+00	4.255-01	4.206+00	4.363-01	
80.	4.464+00	2.512-01	4.043+00	1.694-01	
100.	4.127+00	1.654-01	3.880+00	8.088-02	
150.	3.619+00	7.640-02	3.521+00	2.140-02	
200.	3.289+00	4.380-02	3.237+00	8.534-03	
300.	2.843+00	1.984-02	2.821+00	2.455-03	
400.	2.542+00	1.127-02	2.530+00	1.073-03	
500.	2.318+00	7.252-03	2.310+00	5.936-04	
600.	2.143+00	5.055-03	2.137+00	3.791-04	
800.	1.881+00	2.857-03	1.878+00	1.970-04	
1000.	1.690+00	1.834-03	1.688+00	1.239-04	
1500.	1.376+00	8.180-04	1.372+00	5.839-05	2.792-03
2000.	1.182+00	4.610-04	1.171+00	3.640-05	1.116-02
3000.	9.528-01	2.053-04	9.206-01	2.004-05	3.198-02
4000.	8.210-01	1.156-04	7.676-01	1.362-05	5.332-02
5000.	7.361-01	7.401-05	6.627-01	1.027-05	7.329-02
6000.	6.771-01	5.142-05	5.857-01	8.226-06	9.134-02
8000.	6.006-01	2.894-05	4.790-01	5.869-06	1.216-01
10000.	5.531-01	1.852-05	4.078-01	4.557-06	1.452-01
15000.	4.889-01	8.236-06	3.016-01	2.919-06	1.873-01
20000.	4.620-01	4.634-06	2.419-01	2.146-06	2.200-01
30000.	4.484-01	2.060-06	1.759-01	1.402-06	2.724-01
40000.	4.476-01	1.159-06	1.397-01	1.041-06	3.079-01
50000.	4.488-01	7.416-07	1.165-01	8.278-07	3.323-01
60000.	4.512-01	5.150-07	1.003-01	6.871-07	3.508-01
80000.	4.594-01	2.897-07	7.903-02	5.127-07	3.803-01
100000.	4.723-01	1.854-07	6.557-02	4.090-07	4.068-01

Z= 9 FLUORINE

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.425+07	5.388+01	-4.575-09	1.425+07
.015	1.267+07	5.388+01	-1.031-08	1.267+07
.020	1.531+07	5.388+01	-1.837-08	1.531+07
.030	1.226+07	5.388+01	-4.148-08	1.226+07
.040	8.770+06	5.388+01	-7.401-08	8.770+06
.050	6.383+06	5.387+01	-1.161-07	6.383+06
.060	4.793+06	5.387+01	-1.677-07	4.793+06
.080	2.941+06	5.386+01	-3.004-07	2.940+06
.100	1.964+06	5.385+01	-4.727-07	1.964+06
.150	9.022+05	5.382+01	-1.083-06	9.022+05
.200	5.031+05	5.377+01	-1.959-06	5.031+05
.300	2.101+05	5.362+01	-4.559-06	2.100+05
.400	1.078+05	5.342+01	-8.375-06	1.077+05
.500	6.163+04	5.317+01	-1.351-05	6.157+04
.600	3.743+04	5.287+01	-2.006-05	3.738+04
.800	3.193+05	5.210+01	-3.781-05	3.192+05
1.000	1.827+05	5.113+01	-6.245-05	1.827+05
1.500	6.232+04	4.796+01	-3.222+02	6.259+04
2.000	2.594+04	4.408+01	-2.573+03	2.847+04
3.000	-1.136+04	3.605+01	-2.050+04	9.109+03
4.000	2.445+05	2.906+01	2.405+05	3.956+03
5.000	2.305+06	2.331+01	2.303+06	2.037+03
6.000	7.976+06	1.887+01	7.975+06	1.176+03
8.000	3.724+07	1.306+01	3.724+07	4.874+02
10.000	1.019+08	9.667+00	1.019+08	2.435+02
15.000	5.065+08	5.481+00	5.065+08	6.738+01
20.000	1.417+09	3.575+00	1.417+09	2.668+01
30.000	5.495+09	1.896+00	5.495+09	7.216+00
40.000	1.370+10	1.163+00	1.370+10	2.853+00

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.726+10	7.835-01	2.726+10	1.384+00	
60.	4.727+10	5.629-01	4.727+10	7.644-01	
80.	5.281+00	3.302-01	4.654+00	2.972-01	
100.	4.793+00	2.166-01	4.434+00	1.419-01	
150.	4.131+00	9.952-02	3.994+00	3.772-02	
200.	3.733+00	5.690-02	3.661+00	1.514-02	
300.	3.213+00	2.571-02	3.183+00	4.398-03	
400.	2.867+00	1.458-02	2.851+00	1.928-03	
500.	2.613+00	9.376-03	2.602+00	1.063-03	
600.	2.414+00	6.532-03	2.407+00	6.745-04	
800.	2.118+00	3.689-03	2.114+00	3.479-04	
1000.	1.903+00	2.367-03	1.900+00	2.179-04	
1500.	1.549+00	1.055-03	1.544+00	1.023-04	3.547-03
2000.	1.332+00	5.946-04	1.317+00	6.376-05	1.454-02
3000.	1.076+00	2.647-04	1.036+00	3.512-05	4.025-02
4000.	9.300-01	1.490-04	8.636-01	2.390-05	6.623-02
5000.	8.364-01	9.541-05	7.456-01	1.804-05	9.073-02
6000.	7.722-01	6.628-05	6.589-01	1.445-05	1.132-01
8000.	6.909-01	3.730-05	5.389-01	1.032-05	1.519-01
10000.	6.419-01	2.388-05	4.588-01	8.021-06	1.830-01
15000.	5.775-01	1.061-05	3.393-01	5.142-06	2.381-01
20000.	5.495-01	5.972-06	2.722-01	3.782-06	2.773-01
30000.	5.360-01	2.655-06	1.979-01	2.473-06	3.381-01
40000.	5.393-01	1.493-06	1.571-01	1.837-06	3.822-01
50000.	5.455-01	9.557-07	1.311-01	1.461-06	4.144-01
60000.	5.520-01	6.637-07	1.129-01	1.213-06	4.391-01
80000.	5.650-01	3.734-07	8.891-02	9.051-07	4.761-01
100000.	5.785-01	2.390-07	7.377-02	7.220-07	5.047-01

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 10 NEON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.652+01	6.652+01	1.565-05	0.000
.015	6.652+01	6.652+01	3.522-05	0.000
.020	7.289+06	6.652+01	6.263-05	7.288+06
.030	8.875+06	6.652+01	1.410-04	8.875+06
.040	9.181+06	6.652+01	2.508-04	9.181+06
.050	7.975+06	6.651+01	3.920-04	7.975+06
.060	6.632+06	6.651+01	5.648-04	6.632+06
.080	4.550+06	6.650+01	1.005-03	4.550+06
.100	3.226+06	6.649+01	1.572-03	3.226+06
.150	1.592+06	6.645+01	3.546-03	1.592+06
.200	9.169+05	6.640+01	6.320-03	9.169+05
.300	3.936+05	6.625+01	1.429-02	3.935+05
.400	2.039+05	6.605+01	2.553-02	2.038+05
.500	1.167+05	6.579+01	4.009-02	1.167+05
.600	7.062+04	6.547+01	5.801-02	7.056+04
.800	2.720+04	6.468+01	1.041-01	2.713+04
1.000	2.549+05	6.367+01	1.643-01	2.548+05
1.500	9.083+04	6.034+01	3.728-01	9.077+04
2.000	4.194+04	5.621+01	6.436-01	4.188+04
3.000	1.363+04	4.726+01	1.263+00	1.358+04
4.000	6.009+03	3.891+01	1.842+00	5.969+03
5.000	3.140+03	3.168+01	2.349+00	3.106+03
6.000	1.835+03	2.594+01	2.789+00	1.807+03
8.000	7.793+02	1.813+01	3.486+00	7.577+02
10.000	3.993+02	1.336+01	3.975+00	3.819+02
15.000	1.195+02	7.461+00	4.618+00	1.074+02
20.000	5.279+01	4.847+00	4.945+00	4.300+01
30.000	1.956+01	2.584+00	5.228+00	1.175+01
40.000	1.156+01	1.596+00	5.300+00	4.662+00

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	8.621+00	1.080+00	5.276+00	2.265+00	
60.	7.235+00	7.787-01	5.206+00	1.250+00	
80.	5.962+00	4.588-01	5.017+00	4.857-01	
100.	5.360+00	3.019-01	4.826+00	2.322-01	
150.	4.592+00	1.392-01	4.391+00	6.202-02	
200.	4.144+00	7.977-02	4.040+00	2.499-02	
300.	3.567+00	3.611-02	3.524+00	7.268-03	
400.	3.184+00	2.050-02	3.161+00	3.162-03	
500.	2.902+00	1.319-02	2.887+00	1.716-03	
600.	2.682+00	9.194-03	2.671+00	1.077-03	
800.	2.353+00	5.195-03	2.347+00	5.548-04	
1000.	2.114+00	3.334-03	2.110+00	3.506-04	
1500.	1.721+00	1.487-03	1.715+00	1.683-04	4.401-03
2000.	1.482+00	8.381-04	1.463+00	1.062-04	1.748-02
3000.	1.201+00	3.732-04	1.151+00	5.916-05	4.999-02
4000.	1.043+00	2.101-04	9.595-01	4.039-05	8.317-02
5000.	9.426-01	1.345-04	8.284-01	3.048-05	1.140-01
6000.	8.740-01	9.346-05	7.321-01	2.441-05	1.417-01
8000.	7.864-01	5.259-05	5.988-01	1.740-05	1.876-01
10000.	7.328-01	3.367-05	5.098-01	1.350-05	2.229-01
15000.	6.625-01	1.497-05	3.770-01	8.625-06	2.855-01
20000.	6.375-01	8.422-06	3.024-01	6.331-06	3.351-01
30000.	6.359-01	3.744-06	2.199-01	4.130-06	4.159-01
40000.	6.447-01	2.106-06	1.746-01	3.063-06	4.701-01
50000.	6.524-01	1.348-06	1.456-01	2.434-06	5.068-01
60000.	6.596-01	9.361-07	1.254-01	2.020-06	5.342-01
80000.	6.769-01	5.266-07	9.879-02	1.506-06	5.781-01
100000.	7.001-01	3.370-07	8.196-02	1.201-06	6.181-01

Z= 11 SODIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	8.329+04	8.049+01	6.442-05	8.321+04
.015	1.099+05	8.049+01	1.447-04	1.098+05
.020	9.343+04	8.048+01	2.568-04	9.335+04
.030	6.158+04	8.048+01	5.757-04	6.150+04
.040	8.618+06	8.047+01	1.020-03	8.618+06
.050	8.430+06	8.046+01	1.588-03	8.430+06
.060	7.306+06	8.045+01	2.278-03	7.306+06
.080	5.175+06	8.042+01	4.021-03	5.175+06
.100	3.723+06	8.038+01	6.236-03	3.723+06
.150	1.877+06	8.024+01	1.378-02	1.877+06
.200	1.100+06	8.006+01	2.403-02	1.100+06
.300	4.905+05	7.955+01	5.202-02	4.904+05
.400	2.657+05	7.889+01	8.884-02	2.656+05
.500	1.606+05	7.809+01	1.331-01	1.605+05
.600	1.040+05	7.719+01	1.835-01	1.039+05
.800	4.910+04	7.515+01	2.971-01	4.902+04
1.000	2.505+04	7.298+01	4.189-01	2.498+04
1.500	1.271+05	6.774+01	7.165-01	1.271+05
2.000	5.994+04	6.282+01	1.000+00	5.988+04
3.000	1.953+04	5.361+01	1.535+00	1.947+04
4.000	8.578+03	4.517+01	2.042+00	8.530+03
5.000	4.485+03	3.778+01	2.517+00	4.444+03
6.000	2.627+03	3.166+01	2.955+00	2.592+03
8.000	1.122+03	2.268+01	3.697+00	1.096+03
10.000	5.783+02	1.679+01	4.235+00	5.572+02
15.000	1.746+02	9.387+00	4.971+00	1.603+02
20.000	7.681+01	6.160+00	5.353+00	6.530+01
30.000	2.712+01	3.274+00	5.684+00	1.816+01
40.000	1.503+01	2.017+00	5.776+00	7.238+00

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.064+01	1.363+00	5.760+00	3.515+00	
60.	8.609+00	9.814-01	5.692+00	1.937+00	
80.	6.826+00	5.775-01	5.500+00	7.484-01	
100.	6.032+00	3.797-01	5.295+00	3.570-01	
150.	5.094+00	1.749-01	4.823+00	9.601-02	
200.	4.579+00	1.001-01	4.440+00	3.909-02	
300.	3.931+00	4.530-02	3.875+00	1.158-02	
400.	3.506+00	2.571-02	3.476+00	5.077-03	
500.	3.195+00	1.654-02	3.175+00	2.744-03	
600.	2.951+00	1.153-02	2.938+00	1.709-03	
800.	2.589+00	6.513-03	2.581+00	8.748-04	
1000.	2.326+00	4.179-03	2.321+00	5.518-04	
1500.	1.894+00	1.864-03	1.887+00	2.651-04	5.357-03
2000.	1.633+00	1.050-03	1.610+00	1.677-04	2.203-02
3000.	1.327+00	4.677-04	1.266+00	9.354-05	6.037-02
4000.	1.155+00	2.633-04	1.055+00	6.389-05	9.883-02
5000.	1.047+00	1.686-04	9.113-01	4.823-05	1.351-01
6000.	9.739-01	1.171-04	8.053-01	3.862-05	1.684-01
8000.	8.846-01	6.591-05	6.587-01	2.753-05	2.258-01
10000.	8.331-01	4.219-05	5.608-01	2.135-05	2.723-01
15000.	7.693-01	1.876-05	4.147-01	1.364-05	3.545-01
20000.	7.444-01	1.055-05	3.327-01	1.001-05	4.118-01
30000.	7.403-01	4.691-06	2.419-01	6.524-06	4.984-01
40000.	7.533-01	2.639-06	1.921-01	4.839-06	5.612-01
50000.	7.678-01	1.689-06	1.602-01	3.845-06	6.076-01
60000.	7.814-01	1.173-06	1.379-01	3.189-06	6.435-01
80000.	8.060-01	6.599-07	1.087-01	2.379-06	6.974-01
100000.	8.291-01	4.223-07	9.016-02	1.896-06	7.390-01

Z= 12 MAGNESIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	3.602+04	9.579+01	1.058-04	3.593+04
.015	1.018+05	9.579+01	2.375-04	1.017+05
.020	1.642+05	9.578+01	4.214-04	1.641+05
.030	1.834+05	9.578+01	9.443-04	1.834+05
.040	1.678+05	9.577+01	1.672-03	1.677+05
.050	1.490+05	9.575+01	2.602-03	1.489+05
.060	8.053+06	9.574+01	3.732-03	8.053+06
.080	6.943+06	9.570+01	6.580-03	6.943+06
.100	5.189+06	9.565+01	1.020-02	5.188+06
.150	2.631+06	9.548+01	2.247-02	2.631+06
.200	1.530+06	9.525+01	3.910-02	1.530+06
.300	6.772+05	9.461+01	8.417-02	6.771+05
.400	3.678+05	9.377+01	1.429-01	3.677+05
.500	2.245+05	9.276+01	2.127-01	2.244+05
.600	1.475+05	9.161+01	2.911-01	1.474+05
.800	7.289+04	8.900+01	4.637-01	7.280+04
1.000	3.994+04	8.617+01	6.406-01	3.985+04
1.500	1.646+05	7.913+01	1.026+00	1.645+05
2.000	7.962+04	7.241+01	1.338+00	7.955+04
3.000	2.656+04	6.068+01	1.839+00	2.650+04
4.000	1.181+04	5.137+01	2.305+00	1.176+04
5.000	6.231+03	4.384+01	2.758+00	6.184+03
6.000	3.675+03	3.750+01	3.188+00	3.634+03
8.000	1.587+03	2.761+01	3.942+00	1.555+03
10.000	8.244+02	2.069+01	4.507+00	7.992+02
15.000	2.512+02	1.158+01	5.322+00	2.343+02
20.000	1.099+02	7.600+00	5.761+00	9.656+01
30.000	3.728+01	4.022+00	6.140+00	2.712+01
40.000	1.958+01	2.468+00	6.251+00	1.086+01

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.320+01	1.664+00	6.243+00	5.291+00	
60.	1.029+01	1.196+00	6.178+00	2.920+00	
80.	7.811+00	7.019-01	5.977+00	1.132+00	
100.	6.764+00	4.608-01	5.762+00	5.417-01	
150.	5.610+00	2.118-01	5.252+00	1.459-01	
200.	5.017+00	1.212-01	4.836+00	5.925-02	
300.	4.295+00	5.476-02	4.223+00	1.744-02	
400.	3.828+00	3.106-02	3.789+00	7.644-03	
500.	3.486+00	1.998-02	3.462+00	4.159-03	
600.	3.220+00	1.392-02	3.204+00	2.608-03	
800.	2.825+00	7.862-03	2.815+00	1.340-03	
1000.	2.538+00	5.044-03	2.532+00	8.440-04	
1500.	2.067+00	2.249-03	2.058+00	4.028-04	6.420-03
2000.	1.783+00	1.267-03	1.756+00	2.536-04	2.543-02
3000.	1.454+00	5.642-04	1.381+00	1.409-04	7.218-02
4000.	1.271+00	3.176-04	1.151+00	9.615-05	1.196-01
5000.	1.158+00	2.034-04	9.941-01	7.257-05	1.636-01
6000.	1.082+00	1.413-04	8.786-01	5.813-05	2.030-01
8000.	9.868-01	7.950-05	7.185-01	4.146-05	2.681-01
10000.	9.298-01	5.090-05	6.117-01	3.217-05	3.180-01
15000.	8.578-01	2.263-05	4.524-01	2.057-05	4.054-01
20000.	8.370-01	1.273-05	3.629-01	1.511-05	4.740-01
30000.	8.505-01	5.659-06	2.639-01	9.859-06	5.866-01
40000.	8.722-01	3.183-06	2.095-01	7.315-06	6.626-01
50000.	8.890-01	2.037-06	1.748-01	5.814-06	7.143-01
60000.	9.034-01	1.415-06	1.505-01	4.824-06	7.530-01
80000.	9.331-01	7.959-07	1.185-01	3.599-06	8.146-01
100000.	9.688-01	5.094-07	9.836-02	2.870-06	8.704-01

TABLE II. CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 13 ALUMINUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.139+05	1.124+02	1.265-04	4.137+05	
.015	2.159+05	1.124+02	2.840-04	2.158+05	
.020	2.569+05	1.124+02	5.038-04	2.568+05	
.030	2.833+05	1.124+02	1.129-03	2.831+05	
.040	2.675+05	1.124+02	1.999-03	2.674+05	
.050	2.437+05	1.124+02	3.110-03	2.436+05	
.060	2.207+05	1.124+02	4.461-03	2.206+05	
.080	5.929+06	1.123+02	7.864-03	5.928+06	
.100	6.885+06	1.122+02	1.219-02	6.885+06	
.150	3.954+06	1.120+02	2.684-02	3.954+06	
.200	2.242+06	1.118+02	4.670-02	2.242+06	
.300	9.280+05	1.110+02	1.005-01	9.278+05	
.400	4.826+05	1.100+02	1.704-01	4.824+05	
.500	2.876+05	1.087+02	2.535-01	2.875+05	
.600	1.873+05	1.073+02	3.467-01	1.871+05	
.800	9.367+04	1.041+02	5.512-01	9.357+04	
1.000	5.369+04	1.006+02	7.595-01	5.359+04	
1.500	1.798+04	9.164+01	1.206+00	1.789+04	
2.000	1.038+05	8.299+01	1.557+00	1.037+05	
3.000	3.558+04	6.835+01	2.093+00	3.551+04	
4.000	1.603+04	5.780+01	2.572+00	1.597+04	
5.000	8.527+03	4.985+01	3.030+00	8.474+03	
6.000	5.060+03	4.318+01	3.459+00	5.013+03	
8.000	2.204+03	3.250+01	4.208+00	2.167+03	
10.000	1.151+03	2.474+01	4.784+00	1.122+03	
15.000	3.525+02	1.389+01	5.671+00	3.330+02	
20.000	1.534+02	9.193+00	6.164+00	1.380+02	
30.000	5.042+01	4.847+00	6.586+00	3.898+01	
40.000	2.538+01	2.963+00	6.716+00	1.570+01	
50.	1.640+01	1.993+00	6.720+00	7.689+00	
60.	1.236+01	1.429+00	6.664+00	4.264+00	
80.	8.955+00	8.372-01	6.454+00	1.664+00	
100.	7.573+00	5.488-01	6.227+00	7.980-01	
150.	6.151+00	2.518-01	5.684+00	2.151-01	
200.	5.469+00	1.439-01	5.238+00	8.729-02	
300.	4.665+00	6.495-02	4.575+00	2.568-02	
400.	4.153+00	3.682-02	4.105+00	1.124-02	
500.	3.781+00	2.368-02	3.751+00	6.116-03	
600.	3.492+00	1.649-02	3.471+00	3.833-03	
800.	3.062+00	9.313-03	3.050+00	1.966-03	
1000.	2.750+00	5.974-03	2.743+00	1.236-03	
1500.	2.240+00	2.663-03	2.229+00	5.880-04	7.509-03
2000.	1.934+00	1.501-03	1.902+00	3.697-04	2.949-02
3000.	1.582+00	6.679-04	1.496+00	2.053-04	8.472-02
4000.	1.389+00	3.760-04	1.247+00	1.401-04	1.410-01
5000.	1.270+00	2.408-04	1.077+00	1.058-04	1.929-01
6000.	1.191+00	1.672-04	9.518-01	8.475-05	2.391-01
8000.	1.093+00	9.411-05	7.784-01	6.048-05	3.145-01
10000.	1.034+00	6.024-05	6.627-01	4.694-05	3.711-01
15000.	9.600-01	2.678-05	4.901-01	3.004-05	4.698-01
20000.	9.437-01	1.507-05	3.931-01	2.206-05	5.505-01
30000.	9.722-01	6.698-06	2.859-01	1.440-05	6.863-01
40000.	1.004+00	3.768-06	2.270-01	1.069-05	7.766-01
50000.	1.025+00	2.412-06	1.893-01	8.498-06	8.361-01
60000.	1.043+00	1.675-06	1.630-01	7.052-06	8.801-01
80000.	1.079+00	9.421-07	1.284-01	5.261-06	9.508-01
100000.	1.124+00	6.030-07	1.066-01	4.195-06	1.017+00

Z= 14 SILICON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	6.447+06	1.304+02	1.317-04	6.447+06	
.015	1.040+06	1.304+02	2.958-04	1.040+06	
.020	4.961+05	1.304+02	5.247-04	4.960+05	
.030	4.591+05	1.304+02	1.176-03	4.590+05	
.040	4.643+05	1.304+02	2.082-03	4.642+05	
.050	4.443+05	1.303+02	3.240-03	4.441+05	
.060	4.153+05	1.303+02	4.647-03	4.152+05	
.080	3.573+05	1.303+02	8.195-03	3.572+05	
.100	3.092+05	1.302+02	1.270-02	3.091+05	
.150	4.655+06	1.300+02	2.798-02	4.655+06	
.200	2.895+06	1.297+02	4.870-02	2.895+06	
.300	1.241+06	1.289+02	1.049-01	1.241+06	
.400	6.462+05	1.278+02	1.781-01	6.460+05	
.500	3.838+05	1.265+02	2.651-01	3.837+05	
.600	2.491+05	1.250+02	3.630-01	2.490+05	
.800	1.245+05	1.214+02	5.785-01	1.243+05	
1.000	7.177+04	1.175+02	7.997-01	7.166+04	
1.500	2.513+04	1.068+02	1.284+00	2.502+04	
2.000	1.308+05	9.608+01	1.676+00	1.307+05	
3.000	4.623+04	7.782+01	2.289+00	4.615+04	
4.000	2.108+04	6.530+01	2.819+00	2.102+04	
5.000	1.129+04	5.638+01	3.301+00	1.123+04	
6.000	6.725+03	4.908+01	3.738+00	6.672+03	
8.000	2.943+03	3.756+01	4.482+00	2.901+03	
10.000	1.542+03	2.916+01	5.065+00	1.508+03	
15.000	4.738+02	1.691+01	6.016+00	4.509+02	
20.000	2.058+02	1.090+01	6.563+00	1.883+02	
30.000	6.641+01	5.602+00	7.032+00	5.377+01	
40.000	3.233+01	3.346+00	7.180+00	2.181+01	
50.	2.014+01	2.212+00	7.189+00	1.073+01	
60.	1.468+01	1.568+00	7.131+00	5.978+00	
80.	1.018+01	9.033-01	6.925+00	2.348+00	
100.	8.406+00	5.861-01	6.690+00	1.130+00	
150.	6.682+00	2.651-01	6.112+00	3.048-01	
200.	5.907+00	1.504-01	5.634+00	1.232-01	
300.	5.026+00	6.740-02	4.923+00	3.596-02	
400.	4.472+00	3.807-02	4.419+00	1.575-02	
500.	4.071+00	2.442-02	4.038+00	8.647-03	
600.	3.760+00	1.699-02	3.737+00	5.474-03	
800.	3.297+00	9.574-03	3.284+00	2.828-03	
1000.	2.961+00	6.135-03	2.953+00	1.778-03	
1500.	2.413+00	2.731-03	2.401+00	8.417-04	8.750-03
2000.	2.086+00	1.537-03	2.049+00	5.269-04	3.518-02
3000.	1.710+00	6.838-04	1.611+00	2.912-04	9.827-02
4000.	1.506+00	3.848-04	1.343+00	1.984-04	1.617-01
5000.	1.381+00	2.463-04	1.160+00	1.497-04	2.206-01
6000.	1.299+00	1.711-04	1.025+00	1.199-04	2.736-01
8000.	1.201+00	9.625-05	8.383-01	8.557-05	3.621-01
10000.	1.145+00	6.161-05	7.137-01	6.643-05	4.307-01
15000.	1.078+00	2.739-05	5.278-01	4.254-05	5.505-01
20000.	1.065+00	1.541-05	4.234-01	3.126-05	6.416-01
30000.	1.097+00	6.848-06	3.079-01	2.042-05	7.887-01
40000.	1.135+00	3.852-06	2.444-01	1.516-05	8.905-01
50000.	1.165+00	2.465-06	2.039-01	1.205-05	9.608-01
60000.	1.189+00	1.712-06	1.755-01	1.000-05	1.014+00
80000.	1.233+00	9.630-07	1.383-01	7.465-06	1.095+00
100000.	1.279+00	6.164-07	1.147-01	5.953-06	1.164+00

Z= 15 PHOSPHORUS

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	3.591+07	1.497+02	1.189-04	3.591+07	
.015	4.449+06	1.497+02	2.670-04	4.449+06	
.020	1.104+06	1.497+02	4.737-04	1.103+06	
.030	5.926+05	1.497+02	1.062-03	5.925+05	
.040	6.093+05	1.496+02	1.880-03	6.092+05	
.050	5.930+05	1.496+02	2.927-03	5.929+05	
.060	5.563+05	1.496+02	4.198-03	5.562+05	
.080	4.748+05	1.496+02	7.406-03	4.747+05	
.100	4.060+05	1.495+02	1.148-02	4.059+05	
.150	4.523+06	1.493+02	2.533-02	4.523+06	
.200	3.651+06	1.490+02	4.413-02	3.651+06	
.300	1.705+06	1.482+02	9.524-02	1.704+06	
.400	8.925+05	1.471+02	1.621-01	8.924+05	
.500	5.262+05	1.458+02	2.421-01	5.260+05	
.600	3.383+05	1.442+02	3.324-01	3.381+05	
.800	1.664+05	1.406+02	5.336-01	1.663+05	
1.000	9.518+04	1.364+02	7.441-01	9.504+04	
1.500	3.364+04	1.244+02	1.230+00	3.351+04	
2.000	1.551+04	1.117+02	1.654+00	1.540+04	
3.000	5.853+04	8.951+01	2.371+00	5.844+04	
4.000	2.706+04	7.439+01	2.985+00	2.698+04	
5.000	1.460+04	6.381+01	3.520+00	1.453+04	
6.000	8.744+03	5.541+01	3.987+00	8.684+03	
8.000	3.853+03	4.271+01	4.755+00	3.806+03	
10.000	2.028+03	3.360+01	5.357+00	1.989+03	
15.000	6.270+02	1.943+01	6.366+00	6.012+02	
20.000	2.727+02	1.283+01	6.956+00	2.529+02	
30.000	8.700+01	6.624+00	7.470+00	7.291+01	
40.000	4.133+01	3.961+00	7.640+00	2.973+01	
50.	2.497+01	2.621+00	7.660+00	1.469+01	
60.	1.767+01	1.859+00	7.607+00	8.204+00	
80.	1.170+01	1.072+00	7.394+00	3.236+00	
100.	9.406+00	6.955-01	7.149+00	1.562+00	
150.	7.278+00	3.147-01	6.541+00	4.222-01	
200.	6.382+00	1.786-01	6.033+00	1.708-01	
300.	5.403+00	8.004-02	5.273+00	4.988-02	
400.	4.801+00	4.521-02	4.734+00	2.186-02	
500.	4.367+00	2.901-02	4.326+00	1.202-02	
600.	4.032+00	2.018-02	4.004+00	7.612-03	
800.	3.534+00	1.137-02	3.519+00	3.924-03	
1000.	3.174+00	7.287-03	3.164+00	2.461-03	
1500.	2.587+00	3.244-03	2.572+00	1.159-03	1.024-02
2000.	2.236+00	1.826-03	2.195+00	7.235-04	3.892-02
3000.	1.840+00	8.123-04	1.726+00	3.994-04	1.127-01
4000.	1.629+00	4.571-04	1.439+00	2.722-04	1.887-01
5000.	1.502+00	2.926-04	1.243+00	2.055-04	2.591-01
6000.	1.420+00	2.032-04	1.098+00	1.647-04	3.216-01
8000.	1.321+00	1.143-04	8.982-01	1.177-04	4.223-01
10000.	1.261+00	7.318-05	7.647-01	9.144-05	4.963-01
15000.	1.185+00	3.253-05	5.655-01	5.863-05	6.192-01
20000.	1.173+00	1.830-05	4.536-01	4.313-05	7.197-01
30000.	1.229+00	8.134-06	3.299-01	2.820-05	8.994-01
40000.	1.285+00	4.576-06	2.619-01	2.094-05	1.023+00
50000.	1.323+00	2.929-06	2.184-01	1.666-05	1.104+00
60000.	1.351+00	2.034-06	1.881-01	1.383-05	1.163+00
80000.	1.401+00	1.144-06	1.482-01	1.032-05	1.253+00
100000.	1.457+00	7.322-07	1.229-01	8.231-06	1.334+00

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 16 SULFUR

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	8.310+07	1.703+02	1.055-04	8.310+07
.015	1.353+07	1.703+02	2.370-04	1.353+07
.020	3.484+06	1.703+02	4.206-04	3.484+06
.030	8.044+05	1.703+02	9.430-04	8.043+05
.040	6.658+05	1.703+02	1.670-03	6.656+05
.050	6.891+05	1.702+02	2.601-03	6.890+05
.060	6.984+05	1.702+02	3.732-03	6.982+05
.080	6.671+05	1.702+02	6.586-03	6.670+05
.100	6.126+05	1.701+02	1.022-02	6.124+05
.150	4.852+05	1.699+02	2.257-02	4.851+05
.200	3.982+06	1.696+02	3.938-02	3.982+06
.300	2.097+06	1.689+02	8.525-02	2.097+06
.400	1.138+06	1.678+02	1.456-01	1.137+06
.500	6.828+05	1.665+02	2.182-01	6.826+05
.600	4.438+05	1.649+02	3.009-01	4.436+05
.800	2.213+05	1.612+02	4.875-01	2.212+05
1.000	1.276+05	1.568+02	6.876-01	1.275+05
1.500	4.564+04	1.437+02	1.177+00	4.549+04
2.000	2.119+04	1.293+02	1.639+00	2.105+04
3.000	7.220+04	1.034+02	2.472+00	7.210+04
4.000	3.390+04	8.524+01	3.173+00	3.381+04
5.000	1.845+04	7.242+01	3.758+00	1.838+04
6.000	1.112+04	6.249+01	4.248+00	1.105+04
8.000	4.938+03	4.824+01	5.022+00	4.885+03
10.000	2.613+03	3.844+01	5.633+00	2.569+03
15.000	8.141+02	2.303+01	6.698+00	7.844+02
20.000	3.543+02	1.496+01	7.338+00	3.321+02
30.000	1.120+02	7.757+00	7.903+00	9.631+01
40.000	5.216+01	4.649+00	8.093+00	3.942+01

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	3.073+01	3.079+00	8.122+00	1.953+01	
60.	2.120+01	2.185+00	8.074+00	1.094+01	
80.	1.345+01	1.261+00	7.857+00	4.333+00	
100.	1.052+01	8.187-01	7.605+00	2.101+00	
150.	7.905+00	3.707-01	6.962+00	5.719-01	
200.	6.865+00	2.104-01	6.423+00	2.318-01	
300.	5.779+00	9.433-02	5.617+00	6.766-02	
400.	5.128+00	5.329-02	5.045+00	2.965-02	
500.	4.662+00	3.419-02	4.612+00	1.634-02	
600.	4.303+00	2.378-02	4.269+00	1.038-02	
800.	3.771+00	1.341-02	3.752+00	5.358-03	
1000.	3.387+00	8.591-03	3.375+00	3.356-03	
1500.	2.760+00	3.825-03	2.744+00	1.576-03	1.150-02
2000.	2.390+00	2.153-03	2.341+00	9.817-04	4.576-02
3000.	1.971+00	9.578-04	1.841+00	5.408-04	1.288-01
4000.	1.748+00	5.390-04	1.535+00	3.682-04	2.124-01
5000.	1.616+00	3.450-04	1.325+00	2.779-04	2.899-01
6000.	1.531+00	2.396-04	1.171+00	2.227-04	3.592-01
8000.	1.432+00	1.348-04	9.580-01	1.591-04	4.736-01
10000.	1.377+00	8.630-05	8.157-01	1.237-04	5.612-01
15000.	1.317+00	3.836-05	6.032-01	7.931-05	7.133-01
20000.	1.317+00	2.158-05	4.839-01	5.834-05	8.326-01
30000.	1.382+00	9.592-06	3.519-01	3.815-05	1.030+00
40000.	1.445+00	5.396-06	2.794-01	2.834-05	1.166+00
50000.	1.490+00	3.453-06	2.330-01	2.254-05	1.257+00
60000.	1.525+00	2.398-06	2.006-01	1.871-05	1.325+00
80000.	1.586+00	1.349-06	1.581-01	1.397-05	1.428+00
100000.	1.649+00	8.634-07	1.311-01	1.114-05	1.518+00

Z= 17 CHLORINE

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.108+08	1.922+02	8.940-05	1.108+08
.015	1.609+07	1.922+02	2.008-04	1.609+07
.020	4.250+06	1.922+02	3.565-04	4.250+06
.030	1.432+06	1.922+02	7.995-04	1.432+06
.040	1.210+06	1.922+02	1.417-03	1.210+06
.050	1.127+06	1.922+02	2.207-03	1.127+06
.060	1.045+06	1.922+02	3.167-03	1.045+06
.080	8.896+05	1.921+02	5.594-03	8.894+05
.100	7.617+05	1.921+02	8.684-03	7.615+05
.150	5.493+05	1.919+02	1.922-02	5.491+05
.200	4.261+05	1.916+02	3.360-02	4.259+05
.300	2.567+06	1.909+02	7.305-02	2.567+06
.400	1.440+06	1.898+02	1.253-01	1.440+06
.500	8.686+05	1.885+02	1.888-01	8.684+05
.600	5.631+05	1.870+02	2.616-01	5.629+05
.800	2.779+05	1.832+02	4.289-01	2.778+05
1.000	1.589+05	1.787+02	6.138-01	1.587+05
1.500	5.648+04	1.647+02	1.096+00	5.631+04
2.000	2.663+04	1.487+02	1.587+00	2.648+04
3.000	8.778+04	1.193+02	2.523+00	8.766+04
4.000	4.189+04	9.784+01	3.313+00	4.179+04
5.000	2.299+04	8.234+01	3.956+00	2.291+04
6.000	1.393+04	7.055+01	4.482+00	1.385+04
8.000	6.226+03	5.443+01	5.291+00	6.167+03
10.000	3.308+03	4.378+01	5.927+00	3.258+03
15.000	1.036+03	2.664+01	7.045+00	1.003+03
20.000	4.519+02	1.727+01	7.723+00	4.269+02
30.000	1.424+02	9.286+00	8.336+00	1.248+02
40.000	6.556+01	5.699+00	8.551+00	5.131+01

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	3.793+01	3.834+00	8.591+00	2.551+01	
60.	2.562+01	2.750+00	8.546+00	1.432+01	
80.	1.564+01	1.610+00	8.325+00	5.702+00	
100.	1.189+01	1.055+00	8.062+00	2.777+00	
150.	8.637+00	4.832-01	7.392+00	7.614-01	
200.	7.409+00	2.759-01	6.824+00	3.097-01	
300.	6.185+00	1.245-01	5.970+00	9.064-02	
400.	5.472+00	7.055-02	5.362+00	3.971-02	
500.	4.968+00	4.535-02	4.901+00	2.186-02	
600.	4.582+00	3.159-02	4.536+00	1.386-02	
800.	4.012+00	1.783-02	3.987+00	7.124-03	
1000.	3.602+00	1.144-02	3.586+00	4.448-03	
1500.	2.935+00	5.099-03	2.915+00	2.077-03	1.320-02
2000.	2.541+00	2.872-03	2.487+00	1.292-03	4.938-02
3000.	2.104+00	1.278-03	1.956+00	7.111-04	1.456-01
4000.	1.877+00	7.196-04	1.631+00	4.845-04	2.447-01
5000.	1.745+00	4.608-04	1.408+00	3.659-04	3.356-01
6000.	1.660+00	3.201-04	1.245+00	2.935-04	4.150-01
8000.	1.558+00	1.801-04	1.018+00	2.100-04	5.398-01
10000.	1.495+00	1.153-04	8.666-01	1.633-04	6.284-01
15000.	1.417+00	5.126-05	6.409-01	1.049-04	7.759-01
20000.	1.422+00	2.884-05	5.141-01	7.721-05	9.077-01
30000.	1.522+00	1.282-05	3.739-01	5.053-05	1.148+00
40000.	1.601+00	7.210-06	2.968-01	3.755-05	1.304+00
50000.	1.648+00	4.615-06	2.476-01	2.988-05	1.400+00
60000.	1.681+00	3.205-06	2.132-01	2.481-05	1.468+00
80000.	1.745+00	1.803-06	1.679-01	1.852-05	1.577+00
100000.	1.827+00	1.154-06	1.393-01	1.478-05	1.687+00

Z= 18 ARGON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	2.648+08	2.155+02	7.207-05	2.648+08
.015	5.403+07	2.155+02	1.619-04	5.403+07
.020	1.675+07	2.155+02	2.875-04	1.675+07
.030	3.212+06	2.155+02	6.451-04	3.212+06
.040	1.305+06	2.155+02	1.144-03	1.304+06
.050	9.309+05	2.155+02	1.782-03	9.307+05
.060	8.458+05	2.155+02	2.560-03	8.456+05
.080	8.043+05	2.154+02	4.525-03	8.041+05
.100	7.668+05	2.154+02	7.032-03	7.666+05
.150	6.514+05	2.152+02	1.560-02	6.512+05
.200	5.505+05	2.149+02	2.735-02	5.503+05
.300	2.944+06	2.142+02	5.979-02	2.944+06
.400	1.779+06	2.132+02	1.032-01	1.779+06
.500	1.100+06	2.119+02	1.564-01	1.100+06
.600	7.206+05	2.104+02	2.182-01	7.203+05
.800	3.581+05	2.067+02	3.632-01	3.579+05
1.000	2.048+05	2.020+02	5.288-01	2.046+05
1.500	7.256+04	1.873+02	9.918-01	7.237+04
2.000	3.420+04	1.701+02	1.496+00	3.403+04
3.000	1.138+04	1.372+02	2.508+00	1.124+04
4.000	5.098+04	1.124+02	3.372+00	5.087+04
5.000	2.824+04	9.385+01	4.074+00	2.814+04
6.000	1.720+04	7.982+01	4.646+00	1.711+04
8.000	7.741+03	6.116+01	5.519+00	7.674+03
10.000	4.129+03	4.926+01	6.199+00	4.073+03
15.000	1.300+03	3.033+01	7.378+00	1.262+03
20.000	5.674+02	1.982+01	8.095+00	5.395+02
30.000	1.780+02	1.066+01	8.758+00	1.586+02
40.000	8.101+01	6.539+00	8.999+00	6.547+01

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	4.612+01	4.396+00	9.050+00	3.267+01	
60.	3.057+01	3.152+00	9.007+00	1.841+01	
80.	1.800+01	1.843+00	8.787+00	7.373+00	
100.	1.333+01	1.207+00	8.516+00	3.607+00	
150.	9.364+00	5.526-01	7.818+00	9.932-01	
200.	7.941+00	3.154-01	7.221+00	4.038-01	
300.	6.581+00	1.422-01	6.321+00	1.177-01	
400.	5.809+00	8.059-02	5.677+00	5.150-02	
500.	5.270+00	5.180-02	5.189+00	2.841-02	
600.	4.857+00	3.607-02	4.803+00	1.807-02	
800.	4.252+00	2.036-02	4.222+00	9.324-03	
1000.	3.816+00	1.306-02	3.797+00	5.829-03	
1500.	3.110+00	5.822-03	3.087+00	2.724-03	1.475-02
2000.	2.698+00	3.279-03	2.634+00	1.693-03	5.906-02
3000.	2.236+00	1.460-03	2.071+00	9.313-04	1.628-01
4000.	1.995+00	8.216-04	1.727+00	6.339-04	2.662-01
5000.	1.854+00	5.260-04	1.491+00	4.785-04	3.621-01
6000.	1.767+00	3.654-04	1.318+00	3.837-04	4.485-01
8000.	1.672+00	2.056-04	1.078+00	2.743-04	5.932-01
10000.	1.624+00	1.316-04	9.176-01	2.133-04	7.063-01
15000.	1.583+00	5.851-05	6.786-01	1.369-04	9.045-01
20000.	1.597+00	3.292-05	5.443-01	1.008-04	1.052+00
30000.	1.681+00	1.463-05	3.959-01	6.594-05	1.285+00
40000.	1.759+00	8.231-06	3.143-01	4.899-05	1.445+00
50000.	1.819+00	5.268-06	2.621-01	3.898-05	1.557+00
60000.	1.867+00	3.659-06	2.257-01	3.236-05	1.642+00
80000.	1.951+00	2.058-06	1.778-01	2.416-05	1.773+00
100000.	2.033+00	1.317-06	1.475-01	1.927-05	1.886+00

TABLE II, CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 19 POTASSIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	6.141+04	2.401+02	1.001-04	6.117+04	
.015	5.764+04	2.401+02	2.249-04	5.740+04	
.020	7.145+07	2.401+02	3.992-04	7.145+07	
.030	5.365+06	2.401+02	8.953-04	5.365+06	
.040	1.569+06	2.401+02	1.587-03	1.569+06	
.050	1.660+06	2.401+02	2.471-03	1.660+06	
.060	1.802+06	2.400+02	3.546-03	1.802+06	
.080	1.683+06	2.399+02	6.263-03	1.682+06	
.100	1.402+06	2.398+02	9.721-03	1.401+06	
.150	8.437+05	2.394+02	2.151-02	8.435+05	
.200	5.393+05	2.389+02	3.759-02	5.391+05	
.300	3.253+06	2.374+02	8.166-02	3.253+06	
.400	2.153+06	2.354+02	1.400-01	2.153+06	
.500	1.367+06	2.330+02	2.107-01	1.366+06	
.600	9.038+05	2.303+02	2.917-01	9.035+05	
.800	4.508+05	2.240+02	4.773-01	4.506+05	
1.000	2.573+05	2.171+02	6.814-01	2.570+05	
1.500	9.044+04	1.994+02	1.209+00	9.024+04	
2.000	4.249+04	1.820+02	1.740+00	4.231+04	
3.000	1.432+04	1.503+02	2.748+00	1.416+04	
4.000	6.070+04	1.245+02	3.604+00	6.057+04	
5.000	3.396+04	1.041+02	4.311+00	3.385+04	
6.000	2.081+04	8.837+01	4.895+00	2.072+04	
8.000	9.442+03	6.745+01	5.804+00	9.369+03	
10.000	5.061+03	5.419+01	6.510+00	5.001+03	
15.000	1.604+03	3.337+01	7.727+00	1.563+03	
20.000	7.027+02	2.244+01	8.472+00	6.718+02	
30.000	2.199+02	1.208+01	9.183+00	1.986+02	
40.000	9.916+01	7.401+00	9.448+00	8.232+01	
50.	5.568+01	4.972+00	9.507+00	4.120+01	
60.	3.631+01	3.563+00	9.472+00	2.327+01	
80.	2.068+01	2.082+00	9.237+00	9.358+00	
100.	1.492+01	1.363+00	8.965+00	4.592+00	
150.	1.013+01	6.236-01	8.233+00	1.272+00	
200.	8.481+00	3.558-01	7.605+00	5.206-01	
300.	6.974+00	1.604-01	6.660+00	1.533-01	
400.	6.143+00	9.086-02	5.985+00	6.742-02	
500.	5.568+00	5.840-02	5.473+00	3.721-02	
600.	5.131+00	4.067-02	5.067+00	2.363-02	
800.	4.490+00	2.296-02	4.455+00	1.214-02	
1000.	4.029+00	1.472-02	4.007+00	7.559-03	
1500.	3.284+00	6.561-03	3.258+00	3.510-03	1.647-02
2000.	2.851+00	3.696-03	2.780+00	2.174-03	6.493-02
3000.	2.370+00	1.645-03	2.186+00	1.193-03	1.811-01
4000.	2.122+00	9.259-04	1.823+00	8.115-04	2.975-01
5000.	1.980+00	5.928-04	1.574+00	6.126-04	4.049-01
6000.	1.893+00	4.118-04	1.391+00	4.913-04	5.008-01
8000.	1.797+00	2.317-04	1.138+00	3.514-04	6.591-01
10000.	1.749+00	1.483-04	9.686-01	2.733-04	7.801-01
15000.	1.707+00	6.594-05	7.163-01	1.756-04	9.907-01
20000.	1.729+00	3.710-05	5.746-01	1.293-04	1.154+00
30000.	1.837+00	1.649-05	4.178-01	8.463-05	1.419+00
40000.	1.931+00	9.276-06	3.317-01	6.290-05	1.599+00
50000.	1.997+00	5.937-06	2.767-01	5.005-05	1.721+00
60000.	2.050+00	4.123-06	2.382-01	4.156-05	1.812+00
80000.	2.144+00	2.319-06	1.877-01	3.103-05	1.957+00
100000.	2.242+00	1.484-06	1.557-01	2.476-05	2.086+00

Z= 20 CALCIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	5.989+03	2.661+02	1.344-04	5.723+03	
.015	9.463+04	2.661+02	3.019-04	9.437+04	
.020	1.279+05	2.661+02	5.358-04	1.277+05	
.030	8.985+06	2.660+02	1.201-03	8.985+06	
.040	1.573+06	2.660+02	2.128-03	1.573+06	
.050	1.421+06	2.660+02	3.312-03	1.421+06	
.060	1.686+06	2.659+02	4.752-03	1.686+06	
.080	1.762+06	2.658+02	8.386-03	1.761+06	
.100	1.550+06	2.657+02	1.301-02	1.549+06	
.150	9.969+05	2.651+02	2.872-02	9.966+05	
.200	6.617+05	2.644+02	5.009-02	6.615+05	
.300	3.437+05	2.625+02	1.084-01	3.434+05	
.400	2.004+06	2.600+02	1.849-01	2.004+06	
.500	1.540+06	2.570+02	2.769-01	1.540+06	
.600	1.091+06	2.535+02	3.814-01	1.091+06	
.800	5.679+05	2.457+02	6.165-01	5.677+05	
1.000	3.252+05	2.373+02	8.672-01	3.249+05	
1.500	1.114+05	2.167+02	1.472+00	1.112+05	
2.000	5.109+04	1.974+02	2.033+00	5.089+04	
3.000	1.708+04	1.634+02	3.028+00	1.691+04	
4.000	8.032+03	1.361+02	3.868+00	7.892+03	
5.000	4.039+04	1.145+02	4.574+00	4.027+04	
6.000	2.488+04	9.758+01	5.167+00	2.478+04	
8.000	1.137+04	7.437+01	6.107+00	1.129+04	
10.000	6.125+03	5.952+01	6.840+00	6.058+03	
15.000	1.958+03	3.771+01	8.091+00	1.912+03	
20.000	8.608+02	2.524+01	8.861+00	8.267+02	
30.000	2.691+02	1.359+01	9.611+00	2.459+02	
40.000	1.205+02	8.323+00	9.896+00	1.022+02	
50.	6.682+01	5.590+00	9.962+00	5.127+01	
60.	4.294+01	4.004+00	9.931+00	2.900+01	
80.	2.374+01	2.339+00	9.697+00	1.170+01	
100.	1.671+01	1.530+00	9.416+00	5.765+00	
150.	1.097+01	7.000-01	8.656+00	1.612+00	
200.	9.063+00	3.993-01	8.000+00	6.635-01	
300.	7.386+00	1.800-01	7.009+00	1.966-01	
400.	6.488+00	1.019-01	6.299+00	8.657-02	
500.	5.873+00	6.551-02	5.760+00	4.765-02	
600.	5.409+00	4.562-02	5.333+00	3.015-02	
800.	4.730+00	2.575-02	4.689+00	1.546-02	
1000.	4.244+00	1.651-02	4.217+00	9.633-03	
1500.	3.459+00	7.359-03	3.429+00	4.482-03	1.832-02
2000.	3.004+00	4.145-03	2.926+00	2.780-03	7.046-02
3000.	2.505+00	1.845-03	2.301+00	1.526-03	2.000-01
4000.	2.253+00	1.038-03	1.919+00	1.037-03	3.317-01
5000.	2.112+00	6.649-04	1.657+00	7.823-04	4.534-01
6000.	2.027+00	4.618-04	1.464+00	6.269-04	5.619-01
8000.	1.937+00	2.599-04	1.198+00	4.478-04	7.386-01
10000.	1.891+00	1.663-04	1.020+00	3.480-04	8.705-01
15000.	1.847+00	7.395-05	7.540-01	2.233-04	1.092+00
20000.	1.872+00	4.160-05	6.048-01	1.643-04	1.267+00
30000.	2.007+00	1.849-05	4.398-01	1.074-04	1.567+00
40000.	2.122+00	1.040-05	3.492-01	7.982-05	1.773+00
50000.	2.201+00	6.658-06	2.913-01	6.350-05	1.910+00
60000.	2.261+00	4.624-06	2.508-01	5.272-05	2.010+00
80000.	2.362+00	2.601-06	1.976-01	3.935-05	2.164+00
100000.	2.465+00	1.665-06	1.639-01	3.139-05	2.301+00

Z= 21 SCANDIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	2.450+06	2.933+02	1.377-04	2.450+06	
.015	3.337+06	2.933+02	3.092-04	3.337+06	
.020	3.219+06	2.933+02	5.488-04	3.219+06	
.030	2.538+06	2.933+02	1.230-03	2.538+06	
.040	4.123+06	2.933+02	2.179-03	4.123+06	
.050	3.181+06	2.932+02	3.392-03	3.181+06	
.060	2.861+06	2.932+02	4.867-03	2.861+06	
.080	2.329+06	2.931+02	8.589-03	2.329+06	
.100	1.862+06	2.929+02	1.332-02	1.862+06	
.150	1.106+06	2.924+02	2.941-02	1.106+06	
.200	7.198+05	2.917+02	5.129-02	7.195+05	
.300	3.744+05	2.898+02	1.109-01	3.741+05	
.400	2.311+05	2.873+02	1.893-01	2.308+05	
.500	1.773+06	2.842+02	2.833-01	1.772+06	
.600	1.238+06	2.807+02	3.901-01	1.238+06	
.800	6.478+05	2.728+02	6.301-01	6.475+05	
1.000	3.770+05	2.642+02	8.855-01	3.768+05	
1.500	1.349+05	2.423+02	1.499+00	1.347+05	
2.000	6.384+04	2.212+02	2.066+00	6.361+04	
3.000	2.177+04	1.833+02	3.073+00	2.158+04	
4.000	9.921+03	1.527+02	3.936+00	9.764+03	
5.000	4.747+04	1.284+02	4.674+00	4.734+04	
6.000	2.979+04	1.092+02	5.305+00	2.968+04	
8.000	1.378+04	8.273+01	6.320+00	1.369+04	
10.000	7.431+03	6.594+01	7.106+00	7.358+03	
15.000	2.355+03	4.281+01	8.419+00	2.304+03	
20.000	1.030+03	2.845+01	9.225+00	9.926+02	
30.000	3.225+02	1.546+01	1.003+01	2.970+02	
40.000	1.445+02	9.565+00	1.034+01	1.246+02	
50.	8.000+01	6.473+00	1.042+01	6.311+01	
60.	5.108+01	4.662+00	1.039+01	3.603+01	
80.	2.764+01	2.743+00	1.015+01	1.475+01	
100.	1.899+01	1.803+00	9.865+00	7.325+00	
150.	1.196+01	8.298-01	9.081+00	2.054+00	
200.	9.714+00	4.750-01	8.397+00	8.419-01	
300.	7.820+00	2.148-01	7.359+00	2.461-01	
400.	6.843+00	1.218-01	6.614+00	1.070-01	
500.	6.185+00	7.838-02	6.048+00	5.846-02	
600.	5.691+00	5.462-02	5.600+00	3.691-02	
800.	4.973+00	3.085-02	4.923+00	1.898-02	
1000.	4.460+00	1.980-02	4.428+00	1.190-02	
1500.	3.635+00	8.828-03	3.601+00	5.605-03	2.013-02
2000.	3.162+00	4.974-03	3.072+00	3.500-03	8.149-02
3000.	2.641+00	2.215-03	2.416+00	1.930-03	2.203-01
4000.	2.375+00	1.247-03	2.015+00	1.313-03	3.576-01
5000.	2.227+00	7.983-04	1.740+00	9.903-04	4.856-01
6000.	2.141+00	5.546-04	1.537+00	7.931-04	6.023-01
8000.	2.060+00	3.121-04	1.257+00	5.658-04	8.013-01
10000.	2.031+00	1.998-04	1.071+00	4.391-04	9.601-01
15000.	2.029+00	8.882-05	7.917-01	2.811-04	1.237+00
20000.	2.064+00	4.997-05	6.351-01	2.066-04	1.429+00
30000.	2.181+00	2.221-05	4.618-01	1.349-04	1.719+00
40000.	2.295+00	1.250-05	3.666-01	1.002-04	1.928+00
50000.	2.387+00	7.998-06	3.058-01	7.964-05	2.081+00
60000.	2.462+00	5.554-06	2.633-01	6.609-05	2.198+00
80000.	2.584+00	3.124-06	2.075-01	4.932-05	2.377+00
100000.	2.690+00	2.000-06	1.721-01	3.933-05	2.518+00

TABLE II, CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 22 TITANIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	2.251+06	3.220+02	1.381-04	2.251+06
.015	4.963+06	3.219+02	3.102-04	4.962+06
.020	5.368+06	3.219+02	5.505-04	5.367+06
.030	4.430+06	3.219+02	1.234-03	4.429+06
.040	3.502+06	3.219+02	2.186-03	3.502+06
.050	2.839+06	3.219+02	3.403-03	2.839+06
.060	2.367+06	3.218+02	4.882-03	2.367+06
.080	1.759+06	3.217+02	8.615-03	1.759+06
.100	1.391+06	3.215+02	1.336-02	1.391+06
.150	9.062+05	3.210+02	2.950-02	9.059+05
.200	6.695+05	3.203+02	5.145-02	6.691+05
.300	4.385+05	3.184+02	1.113-01	4.382+05
.400	3.257+05	3.159+02	1.898-01	3.254+05
.500	1.886+06	3.128+02	2.841-01	1.886+06
.600	1.414+06	3.093+02	3.912-01	1.414+06
.800	7.760+05	3.013+02	6.318-01	7.757+05
1.000	4.573+05	2.924+02	8.879-01	4.570+05
1.500	1.633+05	2.695+02	1.503+00	1.630+05
2.000	7.647+04	2.467+02	2.071+00	7.622+04
3.000	2.584+04	2.052+02	3.087+00	2.563+04
4.000	1.191+04	1.712+02	3.971+00	1.174+04
5.000	5.498+04	1.440+02	4.740+00	5.483+04
6.000	3.483+04	1.224+02	5.408+00	3.470+04
8.000	1.628+04	9.227+01	6.498+00	1.618+04
10.000	8.824+03	7.297+01	7.340+00	8.744+03
15.000	2.815+03	4.639+01	8.725+00	2.760+03
20.000	1.236+03	3.179+01	9.577+00	1.195+03
30.000	3.875+02	1.732+01	1.044+01	3.597+02
40.000	1.732+02	1.076+01	1.078+01	1.517+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	9.527+01	7.297+00	1.087+01	7.710+01	
60.	6.027+01	5.265+00	1.084+01	4.417+01	
80.	3.187+01	3.105+00	1.060+01	1.817+01	
100.	2.140+01	2.044+00	1.031+01	9.048+00	
150.	1.297+01	9.426-01	9.491+00	2.541+00	
200.	1.036+01	5.400-01	8.777+00	1.041+00	
300.	8.245+00	2.444-01	7.696+00	3.042-01	
400.	7.192+00	1.387-01	6.921+00	1.325-01	
500.	6.493+00	8.928-02	6.331+00	7.271-02	
600.	5.971+00	6.222-02	5.863+00	4.613-02	
800.	5.215+00	3.516-02	5.156+00	2.380-02	
1000.	4.676+00	2.256-02	4.638+00	1.491-02	
1500.	3.811+00	1.006-02	3.772+00	7.003-03	2.211-02
2000.	3.317+00	5.671-03	3.219+00	4.361-03	8.869-02
3000.	2.777+00	2.525-03	2.531+00	2.397-03	2.412-01
4000.	2.506+00	1.422-03	2.111+00	1.629-03	3.927-01
5000.	2.358+00	9.103-04	1.822+00	1.227-03	5.335-01
6000.	2.273+00	6.324-04	1.611+00	9.822-04	6.612-01
8000.	2.196+00	3.559-04	1.317+00	7.003-04	8.772-01
10000.	2.170+00	2.278-04	1.122+00	5.435-04	1.048+00
15000.	2.174+00	1.013-04	8.294-01	3.478-04	1.344+00
20000.	2.223+00	5.699-05	6.653-01	2.556-04	1.557+00
30000.	2.374+00	2.533-05	4.838-01	1.669-04	1.890+00
40000.	2.512+00	1.425-05	3.841-01	1.239-04	2.128+00
50000.	2.618+00	9.121-06	3.204-01	9.854-05	2.297+00
60000.	2.701+00	6.334-06	2.759-01	8.178-05	2.425+00
80000.	2.834+00	3.563-06	2.173-01	6.102-05	2.617+00
100000.	2.948+00	2.280-06	1.803-01	4.867-05	2.768+00

Z= 23 VANADIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.472+06	3.519+02	1.380-04	1.472+06
.015	5.716+06	3.519+02	3.098-04	5.716+06
.020	6.294+06	3.519+02	5.498-04	6.294+06
.030	5.247+06	3.519+02	1.233-03	5.247+06
.040	4.181+06	3.518+02	2.183-03	4.180+06
.050	3.411+06	3.518+02	3.399-03	3.411+06
.060	2.860+06	3.517+02	4.876-03	2.860+06
.080	2.143+06	3.516+02	8.605-03	2.142+06
.100	1.705+06	3.515+02	1.334-02	1.704+06
.150	1.121+06	3.510+02	2.946-02	1.121+06
.200	8.327+05	3.503+02	5.138-02	8.323+05
.300	5.487+05	3.484+02	1.111-01	5.484+05
.400	4.089+05	3.459+02	1.895-01	4.085+05
.500	3.258+05	3.428+02	2.836-01	3.254+05
.600	1.561+06	3.393+02	3.905-01	1.561+06
.800	8.858+05	3.312+02	6.304-01	8.855+05
1.000	5.299+05	3.222+02	8.854-01	5.296+05
1.500	1.926+05	2.984+02	1.497+00	1.923+05
2.000	9.098+04	2.741+02	2.061+00	9.070+04
3.000	3.099+04	2.291+02	3.074+00	3.076+04
4.000	1.431+04	1.917+02	3.970+00	1.411+04
5.000	7.816+03	1.614+02	4.764+00	7.649+03
6.000	3.997+04	1.372+02	5.466+00	3.983+04
8.000	1.902+04	1.030+02	6.631+00	1.891+04
10.000	1.040+04	8.088+01	7.533+00	1.031+04
15.000	3.347+03	5.066+01	9.008+00	3.287+03
20.000	1.474+03	3.539+01	9.915+00	1.429+03
30.000	4.623+02	1.932+01	1.084+01	4.321+02
40.000	2.058+02	1.201+01	1.121+01	1.826+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.124+02	8.154+00	1.130+01	9.294+01	
60.	7.047+01	5.887+00	1.129+01	5.330+01	
80.	3.651+01	3.474+00	1.105+01	2.199+01	
100.	2.403+01	2.288+00	1.076+01	1.098+01	
150.	1.408+01	1.056+00	9.913+00	3.111+00	
200.	1.106+01	6.050-01	9.170+00	1.282+00	
300.	8.695+00	2.739-01	8.044+00	3.776-01	
400.	7.554+00	1.555-01	7.234+00	1.648-01	
500.	6.808+00	1.001-01	6.618+00	9.020-02	
600.	6.255+00	6.976-02	6.129+00	5.691-02	
800.	5.458+00	3.942-02	5.390+00	2.910-02	
1000.	4.892+00	2.530-02	4.849+00	1.812-02	
1500.	3.987+00	1.129-02	3.943+00	8.438-03	2.464-02
2000.	3.470+00	6.360-03	3.365+00	5.241-03	9.379-02
3000.	2.918+00	2.832-03	2.646+00	2.881-03	2.660-01
4000.	2.650+00	1.594-03	2.207+00	1.961-03	4.400-01
5000.	2.507+00	1.021-03	1.905+00	1.480-03	5.994-01
6000.	2.426+00	7.092-04	1.684+00	1.187-03	7.402-01
8000.	2.346+00	3.991-04	1.377+00	8.483-04	9.672-01
10000.	2.309+00	2.555-04	1.173+00	6.594-04	1.136+00
15000.	2.293+00	1.136-04	8.671-01	4.232-04	1.425+00
20000.	2.360+00	6.391-05	6.956-01	3.115-04	1.664+00
30000.	2.573+00	2.841-05	5.058-01	2.038-04	2.067+00
40000.	2.732+00	1.598-05	4.016-01	1.514-04	2.330+00
50000.	2.836+00	1.023-05	3.349-01	1.204-04	2.501+00
60000.	2.915+00	7.104-06	2.884-01	9.999-05	2.627+00
80000.	3.062+00	3.996-06	2.272-01	7.465-05	2.834+00
100000.	3.227+00	2.558-06	1.885-01	5.955-05	3.038+00

Z= 24 CHROMIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	5.923+06	3.832+02	1.135-04	5.922+06
.015	1.107+07	3.831+02	2.549-04	1.107+07
.020	1.125+07	3.831+02	4.524-04	1.125+07
.030	8.579+06	3.831+02	1.014-03	8.579+06
.040	6.412+06	3.831+02	1.797-03	6.411+06
.050	4.977+06	3.831+02	2.798-03	4.977+06
.060	4.007+06	3.830+02	4.016-03	4.007+06
.080	2.823+06	3.829+02	7.089-03	2.823+06
.100	2.148+06	3.828+02	1.100-02	2.148+06
.150	1.315+06	3.824+02	2.431-02	1.314+06
.200	9.358+05	3.818+02	4.244-02	9.354+05
.300	5.875+05	3.802+02	9.199-02	5.871+05
.400	4.262+05	3.780+02	1.573-01	4.258+05
.500	3.338+05	3.754+02	2.361-01	3.335+05
.600	1.631+06	3.723+02	3.260-01	1.631+06
.800	1.045+06	3.651+02	5.301-01	1.045+06
1.000	6.469+05	3.568+02	7.509-01	6.465+05
1.500	2.376+05	3.338+02	1.303+00	2.373+05
2.000	1.110+05	3.089+02	1.841+00	1.106+05
3.000	3.682+04	2.604+02	2.862+00	3.656+04
4.000	1.678+04	2.186+02	3.792+00	1.656+04
5.000	9.191+03	1.837+02	4.630+00	9.002+03
6.000	4.556+04	1.557+02	5.381+00	4.540+04
8.000	2.200+04	1.163+02	6.646+00	2.187+04
10.000	1.212+04	9.100+01	7.629+00	1.202+04
15.000	3.934+03	5.708+01	9.236+00	3.868+03
20.000	1.739+03	3.906+01	1.022+01	1.690+03
30.000	5.459+02	2.078+01	1.122+01	5.139+02
40.000	2.422+02	1.262+01	1.163+01	2.180+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.315+02	8.432+00	1.174+01	1.113+02	
60.	8.175+01	6.018+00	1.173+01	6.400+01	
80.	4.150+01	3.498+00	1.149+01	2.651+01	
100.	2.676+01	2.282+00	1.119+01	1.329+01	
150.	1.514+01	1.039+00	1.033+01	3.776+00	
200.	1.171+01	5.918-01	9.560+00	1.557+00	
300.	9.115+00	2.662-01	8.390+00	4.587-01	
400.	7.898+00	1.506-01	7.546+00	2.008-01	
500.	7.112+00	9.672-02	6.905+00	1.105-01	
600.	6.532+00	6.732-02	6.394+00	7.011-02	
800.	5.698+00	3.798-02	5.624+00	3.595-02	
1000.	5.106+00	2.435-02	5.059+00	2.236-02	
1500.	4.163+00	1.085-02	4.114+00	1.035-02	2.716-02
2000.	3.624+00	6.108-03	3.511+00	6.403-03	1.007-01
3000.	3.056+00	2.718-03	2.761+00	3.505-03	2.885-01
4000.	2.787+00	1.530-03	2.303+00	2.381-03	4.800-01
5000.	2.647+00	9.793-04	1.988+00	1.796-03	6.557-01
6000.	2.569+00	6.802-04	1.757+00	1.439-03	8.102-01
8000.	2.495+00	3.827-04	1.437+00	1.028-03	1.057+00
10000.	2.460+00	2.450-04	1.223+00	7.993-04	1.236+00
15000.	2.440+00	1.089-04	9.048-01	5.130-04	1.535+00
20000.	2.512+00	6.127-05	7.258-01	3.776-04	1.785+00
30000.	2.753+00	2.723-05	5.278-01	2.471-04	2.225+00
40000.	2.933+00	1.532-05	4.190-01	1.836-04	2.514+00
50000.	3.048+00	9.805-06	3.495-01	1.461-04	2.699+00
60000.	3.133+00	6.809-06	3.009-01	1.213-04	2.832+00
80000.	3.286+00	3.830-06	2.371-01	9.056-05	3.049+00
100000.	3.459+00	2.451-06	1.967-01	7.225-05	3.263+00

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 25 MANGANESE

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	5.254+06	4.157+02	1.376-04	5.254+06
.015	6.812+06	4.157+02	3.090-04	6.812+06
.020	6.972+06	4.157+02	5.483-04	6.972+06
.030	7.195+06	4.157+02	1.229-03	7.194+06
.040	6.898+06	4.157+02	2.177-03	6.898+06
.050	6.413+06	4.156+02	3.389-03	6.413+06
.060	5.908+06	4.156+02	4.862-03	5.908+06
.080	5.020+06	4.155+02	8.578-03	5.019+06
.100	4.326+06	4.153+02	1.330-02	4.325+06
.150	2.775+06	4.149+02	2.936-02	2.774+06
.200	1.794+06	4.142+02	5.119-02	1.794+06
.300	8.818+05	4.123+02	1.106-01	8.814+05
.400	5.063+05	4.098+02	1.886-01	5.059+05
.500	3.207+05	4.068+02	2.822-01	3.203+05
.600	2.168+05	4.033+02	3.882-01	2.164+05
.800	1.044+06	3.951+02	6.258-01	1.043+06
1.000	6.947+05	3.859+02	8.776-01	6.943+05
1.500	2.705+05	3.605+02	1.476+00	2.702+05
2.000	1.286+05	3.336+02	2.023+00	1.283+05
3.000	4.314+04	2.821+02	3.011+00	4.286+04
4.000	1.969+04	2.381+02	3.914+00	1.945+04
5.000	1.077+04	2.016+02	4.745+00	1.057+04
6.000	6.640+03	1.718+02	5.505+00	6.463+03
8.000	2.511+04	1.287+02	6.807+00	2.497+04
10.000	1.396+04	1.005+02	7.828+00	1.385+04
15.000	4.582+03	6.325+01	9.507+00	4.509+03
20.000	2.034+03	4.343+01	1.054+01	1.980+03
30.000	6.411+02	2.385+01	1.162+01	6.056+02
40.000	2.847+02	1.489+01	1.206+01	2.577+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.543+02	1.014+01	1.219+01	1.320+02	
60.	9.556+01	7.331+00	1.218+01	7.605+01	
80.	4.790+01	4.337+00	1.193+01	3.163+01	
100.	3.041+01	2.860+00	1.164+01	1.591+01	
150.	1.662+01	1.322+00	1.074+01	4.552+00	
200.	1.259+01	7.586-01	9.947+00	1.886+00	
300.	9.634+00	3.438-01	8.732+00	5.581-01	
400.	8.296+00	1.953-01	7.856+00	2.446-01	
500.	7.449+00	1.257-01	7.189+00	1.344-01	
600.	6.831+00	8.763-02	6.659+00	8.513-02	
800.	5.950+00	4.953-02	5.857+00	4.357-02	
1000.	5.328+00	3.179-02	5.269+00	2.708-02	
1500.	4.342+00	1.418-02	4.285+00	1.254-02	2.951-02
2000.	3.785+00	7.994-03	3.657+00	7.753-03	1.121-01
3000.	3.198+00	3.560-03	2.876+00	4.240-03	3.139-01
4000.	2.921+00	2.004-03	2.399+00	2.879-03	5.176-01
5000.	2.780+00	1.284-03	2.071+00	2.170-03	7.054-01
6000.	2.706+00	8.917-04	1.830+00	1.738-03	8.727-01
8000.	2.645+00	5.018-04	1.497+00	1.241-03	1.146+00
10000.	2.627+00	3.213-04	1.274+00	9.642-04	1.351+00
15000.	2.643+00	1.428-04	9.425-01	6.184-04	1.700+00
20000.	2.729+00	8.036-05	7.560-01	4.550-04	1.972+00
30000.	2.978+00	3.572-05	5.498-01	2.976-04	2.428+00
40000.	3.173+00	2.010-05	4.365-01	2.211-04	2.737+00
50000.	3.308+00	1.286-05	3.641-01	1.759-04	2.943+00
60000.	3.409+00	8.932-06	3.135-01	1.460-04	3.096+00
80000.	3.582+00	5.025-06	2.470-01	1.090-04	3.335+00
100000.	3.759+00	3.216-06	2.049-01	8.696-05	3.554+00

Z= 26 IRON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	9.189+06	4.497+02	1.340-04	9.189+06
.015	9.095+06	4.497+02	3.009-04	9.094+06
.020	8.337+06	4.497+02	5.339-04	8.337+06
.030	7.606+06	4.496+02	1.197-03	7.606+06
.040	6.915+06	4.496+02	2.120-03	6.915+06
.050	6.254+06	4.496+02	3.300-03	6.254+06
.060	5.667+06	4.495+02	4.735-03	5.667+06
.080	4.727+06	4.494+02	8.355-03	4.726+06
.100	4.032+06	4.493+02	1.296-02	4.032+06
.150	2.561+06	4.488+02	2.861-02	2.560+06
.200	1.711+06	4.481+02	4.988-02	1.711+06
.300	8.808+05	4.463+02	1.079-01	8.804+05
.400	5.206+05	4.438+02	1.840-01	5.202+05
.500	3.368+05	4.408+02	2.753-01	3.364+05
.600	2.318+05	4.373+02	3.790-01	2.314+05
.800	1.228+06	4.291+02	6.117-01	1.228+06
1.000	8.050+05	4.198+02	8.590-01	8.046+05
1.500	3.123+05	3.937+02	1.451+00	3.120+05
2.000	1.493+05	3.657+02	1.999+00	1.489+05
3.000	5.060+04	3.112+02	3.000+00	5.028+04
4.000	2.320+04	2.639+02	3.922+00	2.293+04
5.000	1.267+04	2.241+02	4.775+00	1.244+04
6.000	7.738+03	1.914+02	5.558+00	7.541+03
8.000	2.843+04	1.434+02	6.910+00	2.828+04
10.000	1.596+04	1.115+02	7.980+00	1.584+04
15.000	5.291+03	6.915+01	9.759+00	5.212+03
20.000	2.360+03	4.792+01	1.086+01	2.301+03
30.000	7.460+02	2.643+01	1.200+01	7.076+02
40.000	3.312+02	1.654+01	1.247+01	3.022+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.790+02	1.128+01	1.261+01	1.551+02	
60.	1.104+02	8.168+00	1.262+01	8.958+01	
80.	5.460+01	4.838+00	1.237+01	3.739+01	
100.	3.413+01	3.193+00	1.208+01	1.886+01	
150.	1.805+01	1.478+00	1.116+01	5.417+00	
200.	1.343+01	8.481-01	1.033+01	2.248+00	
300.	1.013+01	3.846-01	9.075+00	6.662-01	
400.	8.678+00	2.185-01	8.167+00	2.921-01	
500.	7.776+00	1.407-01	7.474+00	1.606-01	
600.	7.123+00	9.808-02	6.924+00	1.017-01	
800.	6.198+00	5.544-02	6.091+00	5.211-02	
1000.	5.548+00	3.559-02	5.480+00	3.240-02	
1500.	4.519+00	1.588-02	4.457+00	1.500-02	3.195-02
2000.	3.945+00	8.950-03	3.803+00	9.276-03	1.233-01
3000.	3.340+00	3.986-03	2.991+00	5.072-03	3.400-01
4000.	3.056+00	2.244-03	2.494+00	3.442-03	5.562-01
5000.	2.913+00	1.437-03	2.154+00	2.594-03	7.552-01
6000.	2.839+00	9.984-04	1.903+00	2.077-03	9.327-01
8000.	2.784+00	5.619-04	1.557+00	1.483-03	1.225+00
10000.	2.775+00	3.597-04	1.325+00	1.152-03	1.448+00
15000.	2.811+00	1.599-04	9.802-01	7.387-04	1.830+00
20000.	2.909+00	8.998-05	7.863-01	5.434-04	2.122+00
30000.	3.168+00	4.000-05	5.718-01	3.554-04	2.596+00
40000.	3.373+00	2.250-05	4.539-01	2.640-04	2.919+00
50000.	3.517+00	1.440-05	3.786-01	2.100-04	3.138+00
60000.	3.628+00	1.000-05	3.260-01	1.743-04	3.301+00
80000.	3.816+00	5.626-06	2.569-01	1.301-04	3.559+00
100000.	4.003+00	3.601-06	2.131-01	1.038-04	3.790+00

Z= 27 COBALT

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	7.996+06	4.849+02	1.332-04	7.996+06
.015	1.150+07	4.849+02	2.991-04	1.150+07
.020	1.268+07	4.849+02	5.308-04	1.268+07
.030	1.144+07	4.849+02	1.190-03	1.144+07
.040	9.696+06	4.849+02	2.108-03	9.696+06
.050	8.275+06	4.848+02	3.281-03	8.275+06
.060	7.175+06	4.848+02	4.707-03	7.174+06
.080	5.633+06	4.847+02	8.306-03	5.633+06
.100	4.623+06	4.845+02	1.288-02	4.622+06
.150	2.984+06	4.841+02	2.844-02	2.983+06
.200	2.007+06	4.834+02	4.959-02	2.007+06
.300	1.051+06	4.816+02	1.072-01	1.051+06
.400	6.353+05	4.791+02	1.828-01	6.349+05
.500	4.215+05	4.762+02	2.736-01	4.211+05
.600	2.982+05	4.727+02	3.765-01	2.977+05
.800	1.310+06	4.645+02	6.075-01	1.309+06
1.000	9.056+05	4.550+02	8.527-01	9.052+05
1.500	3.641+05	4.284+02	1.439+00	3.637+05
2.000	1.753+05	3.993+02	1.981+00	1.749+05
3.000	5.936+04	3.419+02	2.974+00	5.901+04
4.000	2.711+04	2.914+02	3.903+00	2.681+04
5.000	1.475+04	2.483+02	4.776+00	1.450+04
6.000	9.003+03	2.126+02	5.587+00	8.785+03
8.000	3.205+04	1.596+02	7.003+00	3.188+04
10.000	1.817+04	1.240+02	8.125+00	1.803+04
15.000	6.089+03	7.698+01	9.992+00	6.002+03
20.000	2.728+03	5.274+01	1.116+01	2.664+03
30.000	8.653+02	2.921+01	1.238+01	8.237+02
40.000	3.842+02	1.833+01	1.289+01	3.529+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.072+02	1.252+01	1.306+01	1.816+02	
60.	1.272+02	9.074+00	1.307+01	1.051+02	
80.	6.219+01	5.382+00	1.282+01	4.398+01	
100.	3.830+01	3.555+00	1.252+01	2.223+01	
150.	1.964+01	1.647+00	1.158+01	6.414+00	
200.	1.435+01	9.458-01	1.073+01	2.673+00	
300.	1.065+01	4.291-01	9.425+00	7.977-01	
400.	9.077+00	2.438-01	8.482+00	3.510-01	
500.	8.113+00	1.570-01	7.763+00	1.930-01	
600.	7.422+00	1.095-01	7.191+00	1.220-01	
800.	6.450+00	6.190-02	6.325+00	6.236-02	
1000.	5.769+00	3.974-02	5.691+00	3.873-02	
1500.	4.699+00	1.773-02	4.628+00	1.791-02	3.479-02
2000.	4.103+00	9.995-03	3.950+00	1.106-02	1.317-01
3000.	3.485+00	4.451-03	3.106+00	6.039-03	3.676-01
4000.	3.201+00	2.506-03	2.590+00	4.096-03	6.040-01
5000.	3.062+00	1.605-03	2.237+00	3.085-03	8.203-01
6000.	2.992+00	1.115-03	1.977+00	2.470-03	1.011+00
8000.	2.939+00	6.275-04	1.617+00	1.762-03	1.320+00
10000.	2.928+00	4.017-04	1.376+00	1.368-03	1.550+00
15000.	2.961+00	1.786-04	1.018+00	8.770-04	1.942+00
20000.	3.077+00	1.005-04	8.165-01	6.450-04	2.260+00
30000.	3.391+00	4.467-05	5.938-01	4.217-04	2.797+00
40000.	3.623+00	2.513-05	4.714-01	3.133-04	3.151+00
50000.	3.775+00	1.608-05	3.932-01	2.492-04	3.381+00
60000.	3.888+00	1.117-05	3.386-01	2.068-04	3.549+00
80000.	4.083+00	6.284-06	2.667-01	1.544-04	3.816+00
100000.	4.288+00	4.022-06	2.213-01	1.232-04	4.067+00

TABLE 11. CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 28 NICKEL

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.612+06	5.215+02	1.310-04	4.611+06	
.015	6.842+06	5.215+02	2.943-04	6.841+06	
.020	7.418+06	5.215+02	5.222-04	7.418+06	
.030	8.244+06	5.215+02	1.171-03	8.243+06	
.040	8.162+06	5.215+02	2.074-03	8.162+06	
.050	7.715+06	5.214+02	3.228-03	7.714+06	
.060	7.178+06	5.214+02	4.631-03	7.177+06	
.080	6.167+06	5.213+02	8.172-03	6.166+06	
.100	5.346+06	5.211+02	1.267-02	5.346+06	
.150	3.231+06	5.207+02	2.798-02	3.231+06	
.200	2.111+06	5.200+02	4.879-02	2.111+06	
.300	1.077+06	5.182+02	1.055-01	1.077+06	
.400	6.429+05	5.158+02	1.799-01	6.424+05	
.500	4.234+05	5.128+02	2.692-01	4.229+05	
.600	2.980+05	5.094+02	3.706-01	2.975+05	
.800	1.684+05	5.012+02	5.980-01	1.679+05	
1.000	9.569+05	4.917+02	8.397-01	9.564+05	
1.500	4.079+05	4.645+02	1.418+00	4.074+05	
2.000	1.953+05	4.344+02	1.954+00	1.949+05	
3.000	6.747+04	3.742+02	2.944+00	6.709+04	
4.000	3.145+04	3.205+02	3.878+00	3.113+04	
5.000	1.732+04	2.742+02	4.764+00	1.704+04	
6.000	1.059+04	2.354+02	5.595+00	1.035+04	
8.000	4.798+03	1.771+02	7.059+00	4.614+03	
10.000	2.042+04	1.373+02	8.229+00	2.028+04	
15.000	6.933+03	8.452+01	1.020+01	6.838+03	
20.000	3.122+03	5.795+01	1.144+01	3.052+03	
30.000	9.944+02	3.221+01	1.274+01	9.494+02	
40.000	4.417+02	2.025+01	1.329+01	4.081+02	
50.	2.378+02	1.385+01	1.348+01	2.105+02	
60.	1.456+02	1.004+01	1.350+01	1.221+02	
80.	7.048+01	5.964+00	1.326+01	5.125+01	
100.	4.287+01	3.941+00	1.295+01	2.598+01	
150.	2.134+01	1.828+00	1.199+01	7.521+00	
200.	1.530+01	1.050+00	1.112+01	3.137+00	
300.	1.118+01	4.765-01	9.771+00	9.361-01	
400.	9.478+00	2.709-01	8.795+00	4.125-01	
500.	8.451+00	1.744-01	8.049+00	2.276-01	
600.	7.722+00	1.216-01	7.456+00	1.445-01	
800.	6.702+00	6.878-02	6.559+00	7.407-02	
1000.	5.991+00	4.415-02	5.901+00	4.602-02	
1500.	4.878+00	1.971-02	4.799+00	2.124-02	3.735-02
2000.	4.269+00	1.111-02	4.096+00	1.309-02	1.484-01
3000.	3.630+00	4.947-03	3.222+00	7.134-03	3.960-01
4000.	3.332+00	2.785-03	2.686+00	4.832-03	6.379-01
5000.	3.187+00	1.784-03	2.319+00	3.637-03	8.616-01
6000.	3.118+00	1.239-03	2.050+00	2.910-03	1.064+00
8000.	3.088+00	6.974-04	1.677+00	2.076-03	1.408+00
10000.	3.112+00	4.465-04	1.427+00	1.612-03	1.682+00
15000.	3.225+00	1.985-04	1.056+00	1.033-03	2.168+00
20000.	3.361+00	1.117-04	8.468-01	7.594-04	2.513+00
30000.	3.645+00	4.965-05	6.158-01	4.965-04	3.028+00
40000.	3.876+00	2.793-05	4.889-01	3.688-04	3.387+00
50000.	4.053+00	1.788-05	4.078-01	2.933-04	3.645+00
60000.	4.195+00	1.242-05	3.511-01	2.435-04	3.844+00
80000.	4.429+00	6.984-06	2.766-01	1.817-04	4.152+00
100000.	4.634+00	4.470-06	2.295-01	1.450-04	4.405+00

Z= 29 COPPER

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	5.350+06	5.594+02	1.053-04	5.349+06	
.015	7.399+06	5.594+02	2.364-04	7.399+06	
.020	8.502+06	5.594+02	4.196-04	8.501+06	
.030	8.894+06	5.594+02	9.409-04	8.893+06	
.040	8.337+06	5.594+02	1.667-03	8.336+06	
.050	7.605+06	5.593+02	2.596-03	7.605+06	
.060	6.908+06	5.593+02	3.725-03	6.908+06	
.080	5.761+06	5.592+02	6.577-03	5.761+06	
.100	4.908+06	5.591+02	1.020-02	4.907+06	
.150	2.853+06	5.587+02	2.256-02	2.852+06	
.200	2.068+06	5.581+02	3.939-02	2.067+06	
.300	1.186+06	5.566+02	8.542-02	1.185+06	
.400	7.441+05	5.545+02	1.462-01	7.436+05	
.500	5.010+05	5.519+02	2.195-01	5.005+05	
.600	3.555+05	5.488+02	3.033-01	3.550+05	
.800	1.996+05	5.415+02	4.936-01	1.991+05	
1.000	1.098+06	5.328+02	7.004-01	1.097+06	
1.500	4.659+05	5.072+02	1.221+00	4.654+05	
2.000	2.250+05	4.779+02	1.737+00	2.245+05	
3.000	7.778+04	4.165+02	2.746+00	7.736+04	
4.000	3.613+04	3.586+02	3.713+00	3.577+04	
5.000	1.985+04	3.070+02	4.630+00	1.954+04	
6.000	1.212+04	2.635+02	5.491+00	1.186+04	
8.000	5.515+03	1.979+02	7.012+00	5.310+03	
10.000	2.285+04	1.530+02	8.241+00	2.269+04	
15.000	7.859+03	9.263+01	1.035+01	7.756+03	
20.000	3.558+03	6.396+01	1.168+01	3.482+03	
30.000	1.138+03	3.553+01	1.308+01	1.090+03	
40.000	5.059+02	2.234+01	1.368+01	4.699+02	
50.	2.721+02	1.527+01	1.389+01	2.429+02	
60.	1.661+02	1.108+01	1.393+01	1.411+02	
80.	7.970+01	6.577+00	1.369+01	5.944+01	
100.	4.794+01	4.346+00	1.339+01	3.020+01	
150.	2.321+01	2.015+00	1.240+01	8.793+00	
200.	1.634+01	1.158+00	1.150+01	3.678+00	
300.	1.174+01	5.255-01	1.011+01	1.101+00	
400.	9.888+00	2.987-01	9.104+00	4.847-01	
500.	8.793+00	1.923-01	8.334+00	2.666-01	
600.	8.023+00	1.341-01	7.721+00	1.687-01	
800.	6.954+00	7.584-02	6.792+00	8.631-02	
1000.	6.214+00	4.869-02	6.111+00	5.362-02	
1500.	5.057+00	2.173-02	4.971+00	2.478-02	4.030-02
2000.	4.429+00	1.225-02	4.242+00	1.530-02	1.593-01
3000.	3.776+00	5.455-03	3.337+00	8.347-03	4.252-01
4000.	3.476+00	3.071-03	2.782+00	5.657-03	6.848-01
5000.	3.332+00	1.967-03	2.402+00	4.259-03	9.235-01
6000.	3.266+00	1.367-03	2.123+00	3.408-03	1.138+00
8000.	3.238+00	7.691-04	1.736+00	2.431-03	1.499+00
10000.	3.262+00	4.924-04	1.478+00	1.887-03	1.782+00
15000.	3.374+00	2.189-04	1.093+00	1.209-03	2.279+00
20000.	3.520+00	1.232-04	8.770-01	8.889-04	2.642+00
30000.	3.846+00	5.475-05	6.378-01	5.811-04	3.207+00
40000.	4.108+00	3.080-05	5.063-01	4.315-04	3.601+00
50000.	4.303+00	1.971-05	4.223-01	3.432-04	3.880+00
60000.	4.456+00	1.369-05	3.636-01	2.849-04	4.092+00
80000.	4.702+00	7.701-06	2.865-01	2.126-04	4.415+00
100000.	4.918+00	4.929-06	2.377-01	1.696-04	4.680+00

Z= 30 ZINC

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	2.508+06	5.987+02	1.264-04	2.507+06	
.015	3.331+06	5.987+02	2.839-04	3.331+06	
.020	4.741+06	5.987+02	5.038-04	4.741+06	
.030	8.044+06	5.986+02	1.129-03	8.043+06	
.040	9.285+06	5.986+02	2.000-03	9.284+06	
.050	9.440+06	5.986+02	3.114-03	9.439+06	
.060	9.157+06	5.985+02	4.468-03	9.156+06	
.080	8.234+06	5.984+02	7.884-03	8.234+06	
.100	7.314+06	5.983+02	1.223-02	7.313+06	
.150	4.809+06	5.978+02	2.700-02	4.809+06	
.200	3.090+06	5.972+02	4.708-02	3.089+06	
.300	1.534+06	5.954+02	1.018-01	1.534+06	
.400	9.095+05	5.930+02	1.737-01	9.089+05	
.500	6.019+05	5.901+02	2.599-01	6.013+05	
.600	4.285+05	5.866+02	3.579-01	4.279+05	
.800	2.503+05	5.784+02	5.778-01	2.497+05	
1.000	1.651+05	5.687+02	8.117-01	1.645+05	
1.500	5.257+05	5.406+02	1.374+00	5.251+05	
2.000	2.565+05	5.088+02	1.898+00	2.560+05	
3.000	8.907+04	4.437+02	2.876+00	8.862+04	
4.000	4.138+04	3.839+02	3.814+00	4.099+04	
5.000	2.272+04	3.310+02	4.718+00	2.238+04	
6.000	1.388+04	2.859+02	5.576+00	1.359+04	
8.000	6.336+03	2.163+02	7.114+00	6.113+03	
10.000	2.558+04	1.675+02	8.367+00	2.540+04	
15.000	8.864+03	1.009+02	1.054+01	8.752+03	
20.000	4.030+03	6.969+01	1.194+01	3.948+03	
30.000	1.295+03	3.879+01	1.342+01	1.243+03	
40.000	5.772+02	2.442+01	1.407+01	5.388+02	
50.	3.106+02	1.670+01	1.431+01	2.796+02	
60.	1.894+02	1.212+01	1.436+01	1.629+02	
80.	9.023+01	7.201+00	1.413+01	6.890+01	
100.	5.363+01	4.760+00	1.382+01	3.505+01	
150.	2.524+01	2.208+00	1.282+01	1.021+01	
200.	1.745+01	1.269+00	1.190+01	4.283+00	
300.	1.233+01	5.760-01	1.046+01	1.288+00	
400.	1.032+01	3.274-01	9.420+00	5.684-01	
500.	9.146+00	2.109-01	8.623+00	3.125-01	
600.	8.332+00	1.471-01	7.988+00	1.975-01	
800.	7.211+00	8.316-02	7.027+00	1.010-01	
1000.	6.439+00	5.339-02	6.322+00	6.283-02	
1500.	5.239+00	2.383-02	5.142+00	2.910-02	4.377-02
2000.	4.591+00	1.343-02	4.389+00	1.798-02	1.707-01
3000.	3.924+00	5.982-03	3.452+00	9.806-03	4.569-01
4000.	3.626+00	3.368-03	2.878+00	6.639-03	7.375-01
5000.	3.488+00	2.157-03	2.485+00	4.993-03	9.961-01
6000.	3.431+00	1.499-03	2.196+00	3.993-03	1.229+00
8000.	3.419+00	8.434-04	1.796+00	2.844-03	1.619+00
10000.	3.456+00	5.399-04	1.529+00	2.206-03	1.924+00
15000.	3.585+00	2.401-04	1.131+00	1.411-03	2.452+00
20000.	3.740+00	1.351-04	9.072-01	1.037-03	2.832+00
30000.	4.084+00	6.004-05	6.598-01	6.770-04	3.424+00
40000.	4.366+00	3.378-05	5.238-01	5.026-04	3.842+00
50000.	4.578+00	2.162-05	4.369-01	3.996-04	4.141+00
60000.	4.746+00	1.501-05	3.762-01	3.316-04	4.370+00
80000.	5.020+00	8.445-06	2.964-01	2.475-04	4.723+00
100000.	5.263+00	5.405-06	2.459-01	1.974-04	5.017+00

Z= 31 GALLIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	3.937+06	6.393+02	1.395-04	3.936+06	
.015	7.782+05	6.392+02	3.133-04	7.775+05	
.020	3.083+06	6.392+02	5.560-04	3.083+06	
.030	2.475+06	6.392+02	1.246-03	2.474+06	
.040	4.122+06	6.392+02	2.207-03	4.122+06	
.050	5.566+06	6.391+02	3.436-03	5.566+06	
.060	6.432+06	6.391+02	4.929-03	6.431+06	
.080	7.034+06	6.390+02	8.697-03	7.033+06	
.100	6.940+06	6.388+02	1.348-02	6.939+06	
.150	5.375+06	6.382+02	2.976-02	5.374+06	
.200	3.814+06	6.374+02	5.187-02	3.814+06	
.300	2.051+06	6.353+02	1.120-01	2.051+06	
.400	1.234+06	6.324+02	1.909-01	1.234+06	
.500	8.069+05	6.289+02	2.854-01	8.062+05	
.600	5.592+05	6.247+02	3.924-01	5.586+05	
.800	3.020+05	6.150+02	6.317-01	3.014+05	
1.000	1.803+05	6.038+02	8.841-01	1.797+05	
1.500	5.935+05	5.721+02	1.478+00	5.929+05	
2.000	2.899+05	5.374+02	2.018+00	2.893+05	
3.000	1.010+05	4.686+02	3.001+00	1.005+05	
4.000	4.703+04	4.072+02	3.940+00	4.662+04	
5.000	2.588+04	3.535+02	4.848+00	2.552+04	
6.000	1.583+04	3.073+02	5.713+00	1.552+04	
8.000	7.236+03	2.344+02	7.267+00	6.994+03	
10.000	3.892+03	1.821+02	8.538+00	3.701+03	
15.000	9.969+03	1.089+02	1.075+01	9.849+03	
20.000	4.565+03	7.559+01	1.218+01	4.477+03	
30.000	1.475+03	4.216+01	1.373+01	1.420+03	
40.000	6.582+02	2.656+01	1.445+01	6.172+02	
50.	3.539+02	1.818+01	1.473+01	3.210+02	
60.	2.153+02	1.319+01	1.477+01	1.873+02	
80.	1.018+02	7.841+00	1.456+01	7.937+01	
100.	5.986+01	5.185+00	1.424+01	4.044+01	
150.	2.745+01	2.406+00	1.324+01	1.180+01	
200.	1.863+01	1.383+00	1.230+01	4.953+00	
300.	1.294+01	6.277-01	1.082+01	1.490+00	
400.	1.076+01	3.568-01	9.740+00	6.587-01	
500.	9.507+00	2.298-01	8.914+00	3.632-01	
600.	8.647+00	1.603-01	8.257+00	2.300-01	
800.	7.472+00	9.063-02	7.263+00	1.178-01	
1000.	6.666+00	5.819-02	6.534+00	7.325-02	
1500.	5.421+00	2.597-02	5.314+00	3.385-02	4.703-02
2000.	4.753+00	1.464-02	4.535+00	2.088-02	1.825-01
3000.	4.075+00	6.520-03	3.567+00	1.136-02	4.899-01
4000.	3.776+00	3.671-03	2.974+00	7.687-03	7.908-01
5000.	3.643+00	2.351-03	2.568+00	5.779-03	1.067+00
6000.	3.590+00	1.633-03	2.270+00	4.620-03	1.314+00
8000.	3.587+00	9.192-04	1.856+00	3.290-03	1.726+00
10000.	3.630+00	5.885-04	1.580+00	2.552-03	2.047+00
15000.	3.780+00	2.617-04	1.169+00	1.632-03	2.609+00
20000.	3.965+00	1.472-04	9.375-01	1.199-03	3.026+00
30000.	4.352+00	6.544-05	6.818-01	7.834-04	3.670+00
40000.	4.647+00	3.682-05	5.412-01	5.816-04	4.105+00
50000.	4.860+00	2.356-05	4.514-01	4.624-04	4.409+00
60000.	5.028+00	1.636-05	3.887-01	3.838-04	4.639+00
80000.	5.311+00	9.205-06	3.062-01	2.864-04	5.004+00
100000.	5.578+00	5.892-06	2.541-01	2.284-04	5.323+00

Z= 32 GERMANIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	2.170+07	6.812+02	1.404-04	2.170+07	
.015	4.287+06	6.812+02	3.153-04	4.286+06	
.020	1.357+06	6.811+02	5.595-04	1.356+06	
.030	1.495+06	6.811+02	1.254-03	1.494+06	
.040	2.180+06	6.811+02	2.222-03	2.179+06	
.050	3.870+06	6.810+02	3.459-03	3.869+06	
.060	5.484+06	6.810+02	4.962-03	5.483+06	
.080	7.467+06	6.808+02	8.756-03	7.467+06	
.100	8.223+06	6.807+02	1.358-02	8.223+06	
.150	6.711+06	6.801+02	2.997-02	6.711+06	
.200	4.746+06	6.792+02	5.226-02	4.745+06	
.300	2.533+06	6.769+02	1.130-01	2.533+06	
.400	1.521+06	6.738+02	1.927-01	1.521+06	
.500	9.957+05	6.700+02	2.883-01	9.950+05	
.600	6.922+05	6.655+02	3.967-01	6.916+05	
.800	3.777+05	6.550+02	6.400-01	3.770+05	
1.000	2.287+05	6.428+02	8.981-01	2.281+05	
1.500	6.613+05	6.079+02	1.514+00	6.607+05	
2.000	3.280+05	5.696+02	2.083+00	3.274+05	
3.000	1.147+05	4.950+02	3.126+00	1.142+05	
4.000	5.331+04	4.309+02	4.103+00	5.288+04	
5.000	2.925+04	3.760+02	5.027+00	2.887+04	
6.000	1.788+04	3.287+02	5.893+00	1.754+04	
8.000	8.193+03	2.530+02	7.434+00	7.932+03	
10.000	4.452+03	1.978+02	8.707+00	4.246+03	
15.000	1.112+04	1.199+02	1.098+01	1.099+04	
20.000	5.114+03	8.171+01	1.247+01	5.020+03	
30.000	1.661+03	4.568+01	1.409+01	1.601+03	
40.000	7.425+02	2.880+01	1.484+01	6.988+02	
50.	3.994+02	1.972+01	1.514+01	3.646+02	
60.	2.428+02	1.432+01	1.520+01	2.133+02	
80.	1.142+02	8.512+00	1.499+01	9.072+01	
100.	6.663+01	5.630+00	1.467+01	4.633+01	
150.	2.983+01	2.613+00	1.366+01	1.356+01	
200.	1.989+01	1.502+00	1.269+01	5.697+00	
300.	1.357+01	6.818-01	1.117+01	1.717+00	
400.	1.121+01	3.876-01	1.006+01	7.607-01	
500.	9.874+00	2.497-01	9.204+00	4.206-01	
600.	8.966+00	1.741-01	8.525+00	2.670-01	
800.	7.734+00	9.845-02	7.498+00	1.370-01	
1000.	6.894+00	6.321-02	6.746+00	8.510-02	
1500.	5.603+00	2.821-02	5.486+00	3.923-02	4.993-02
2000.	4.919+00	1.590-02	4.681+00	2.414-02	1.979-01
3000.	4.225+00	7.083-03	3.682+00	1.311-02	5.230-01
4000.	3.920+00	3.988-03	3.070+00	8.861-03	8.375-01
5000.	3.786+00	2.554-03	2.651+00	6.657-03	1.126+00
6000.	3.736+00	1.774-03	2.343+00	5.321-03	1.386+00
8000.	3.747+00	9.986-04	1.916+00	3.788-03	1.826+00
10000.	3.812+00	6.393-04	1.631+00	2.937-03	2.177+00
15000.	4.010+00	2.843-04	1.206+00	1.879-03	2.802+00
20000.	4.219+00	1.599-04	9.677-01	1.381-03	3.250+00
30000.	4.619+00	7.110-05	7.037-01	9.017-04	3.914+00
40000.	4.926+00	4.000-05	5.587-01	6.695-04	4.367+00
50000.	5.156+00	2.560-05	4.660-01	5.323-04	4.689+00
60000.	5.339+00	1.778-05	4.012-01	4.418-04	4.938+00
80000.	5.641+00	1.000-05	3.161-01	3.297-04	5.325+00
100000.	5.911+00	6.401-06	2.623-01	2.629-04	5.648+00

Z= 33 ARSENIC

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	3.613+07	7.244+02	1.344-04	3.613+07	
.015	1.291+07	7.244+02	3.018-04	1.291+07	
.020	5.180+06	7.244+02	5.356-04	5.179+06	
.030	1.097+06	7.244+02	1.201-03	1.097+06	
.040	2.597+05	7.243+02	2.127-03	2.589+05	
.050	1.001+06	7.243+02	3.311-03	1.000+06	
.060	8.269+05	7.242+02	4.751-03	8.262+05	
.080	4.406+06	7.241+02	8.386-03	4.405+06	
.100	8.483+06	7.239+02	1.301-02	8.482+06	
.150	7.511+06	7.233+02	2.873-02	7.510+06	
.200	4.725+06	7.225+02	5.012-02	4.724+06	
.300	2.182+06	7.201+02	1.085-01	2.182+06	
.400	1.234+06	7.170+02	1.852-01	1.233+06	
.500	7.947+05	7.131+02	2.775-01	7.940+05	
.600	5.580+05	7.085+02	3.825-01	5.573+05	
.800	3.243+05	6.976+02	6.191-01	3.236+05	
1.000	2.163+05	6.847+02	8.724-01	2.156+05	
1.500	6.427+05	6.471+02	1.490+00	6.420+05	
2.000	3.673+05	6.050+02	2.076+00	3.667+05	
3.000	1.294+05	5.236+02	3.172+00	1.288+05	
4.000	6.021+04	4.557+02	4.193+00	5.975+04	
5.000	3.305+04	3.987+02	5.147+00	3.265+04	
6.000	2.021+04	3.497+02	6.032+00	1.985+04	
8.000	9.274+03	2.708+02	7.592+00	8.995+03	
10.000	5.054+03	2.126+02	8.879+00	4.833+03	
15.000	1.236+04	1.265+02	1.119+01	1.222+04	
20.000	5.725+03	8.807+01	1.272+01	5.624+03	
30.000	1.868+03	4.937+01	1.441+01	1.804+03	
40.000	8.361+02	3.116+01	1.522+01	7.897+02	
50.	4.495+02	2.135+01	1.554+01	4.126+02	
60.	2.728+02	1.551+01	1.561+01	2.417+02	
80.	1.277+02	9.224+00	1.541+01	1.031+02	
100.	7.400+01	6.102+00	1.509+01	5.280+01	
150.	3.241+01	2.833+00	1.406+01	1.552+01	
200.	2.122+01	1.628+00	1.307+01	6.523+00	
300.	1.421+01	7.394-01	1.151+01	1.963+00	
400.	1.165+01	4.204-01	1.036+01	8.696-01	
500.	1.024+01	2.708-01	9.486+00	4.817-01	
600.	9.283+00	1.888-01	8.787+00	3.065-01	
800.	7.995+00	1.068-01	7.730+00	1.575-01	
1000.	7.122+00	6.856-02	6.955+00	9.794-02	
1500.	5.786+00	3.060-02	5.657+00	4.514-02	5.369-02
2000.	5.084+00	1.725-02	4.828+00	2.776-02	2.112-01
3000.	4.375+00	7.683-03	3.797+00	1.506-02	5.558-01
4000.	4.069+00	4.326-03	3.166+00	1.017-02	8.888-01
5000.	3.939+00	2.771-03	2.734+00	7.638-03	1.194+00
6000.	3.894+00	1.925-03	2.416+00	6.103-03	1.470+00
8000.	3.915+00	1.083-03	1.976+00	4.344-03	1.933+00
10000.	3.986+00	6.935-04	1.682+00	3.368-03	2.300+00
15000.	4.188+00	3.084-04	1.244+00	2.154-03	2.941+00
20000.	4.397+00	1.735-04	9.980-01	1.582-03	3.397+00
30000.	4.819+00	7.712-05	7.257-01	1.033-03	4.092+00
40000.	5.160+00	4.339-05	5.762-01	7.672-04	4.583+00
50000.	5.418+00	2.777-05	4.806-01	6.100-04	4.936+00
60000.	5.622+00	1.929-05	4.138-01	5.063-04	5.208+00
80000.	5.949+00	1.085-05	3.260-01	3.778-04	5.622+00
100000.	6.227+00	6.943-06	2.705-01	3.013-04	5.956+00

TABLE II. CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 34 SELENIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	7.410+07	7.690+02	1.306-04	7.410+07
.015	2.492+07	7.690+02	2.933-04	2.492+07
.020	9.809+06	7.690+02	5.205-04	9.809+06
.030	2.085+06	7.689+02	1.167-03	2.085+06
.040	5.402+05	7.689+02	2.068-03	5.394+05
.050	1.494+05	7.688+02	3.219-03	1.486+05
.060	1.062+06	7.688+02	4.620-03	1.061+06
.080	3.212+06	7.687+02	8.155-03	3.211+06
.100	6.141+06	7.685+02	1.265-02	6.140+06
.150	7.120+06	7.679+02	2.796-02	7.120+06
.200	5.439+06	7.670+02	4.881-02	5.438+06
.300	3.067+06	7.647+02	1.058-01	3.067+06
.400	1.887+06	7.616+02	1.809-01	1.886+06
.500	1.253+06	7.577+02	2.714-01	1.253+06
.600	8.813+05	7.530+02	3.747-01	8.806+05
.800	4.896+05	7.419+02	6.088-01	4.889+05
1.000	3.014+05	7.285+02	8.618-01	3.007+05
1.500	7.035+05	6.884+02	1.492+00	7.028+05
2.000	4.085+05	6.428+02	2.106+00	4.079+05
3.000	1.456+05	5.545+02	3.272+00	1.450+05
4.000	6.789+04	4.821+02	4.345+00	6.740+04
5.000	3.726+04	4.222+02	5.327+00	3.683+04
6.000	2.276+04	3.711+02	6.224+00	2.239+04
8.000	1.044+04	2.894+02	7.787+00	1.014+04
10.000	5.701+03	2.290+02	9.080+00	5.462+03
15.000	1.356+04	1.384+02	1.143+01	1.341+04
20.000	6.323+03	9.467+01	1.300+01	6.216+03
30.000	2.080+03	5.324+01	1.475+01	2.012+03
40.000	9.352+02	3.365+01	1.559+01	8.860+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.042+02	2.308+01	1.595+01	4.652+02	
60.	3.063+02	1.677+01	1.603+01	2.735+02	
80.	1.430+02	9.978+00	1.584+01	1.172+02	
100.	8.230+01	6.602+00	1.552+01	6.017+01	
150.	3.524+01	3.066+00	1.447+01	1.771+01	
200.	2.267+01	1.763+00	1.345+01	7.451+00	
300.	1.490+01	8.006-01	1.185+01	2.246+00	
400.	1.212+01	4.552-01	1.067+01	9.967-01	
500.	1.062+01	2.932-01	9.771+00	5.528-01	
600.	9.609+00	2.045-01	9.052+00	3.522-01	
800.	8.261+00	1.157-01	7.964+00	1.813-01	
1000.	7.352+00	7.426-02	7.165+00	1.128-01	
1500.	5.971+00	3.315-02	5.828+00	5.197-02	5.787-02
2000.	5.244+00	1.868-02	4.974+00	3.194-02	2.195-01
3000.	4.533+00	8.322-03	3.912+00	1.731-02	5.958-01
4000.	4.243+00	4.686-03	3.262+00	1.167-02	9.648-01
5000.	4.128+00	3.001-03	2.816+00	8.760-03	1.300+00
6000.	4.094+00	2.085-03	2.489+00	6.995-03	1.596+00
8000.	4.118+00	1.173-03	2.036+00	4.974-03	2.076+00
10000.	4.177+00	7.512-04	1.733+00	3.854-03	2.440+00
15000.	4.362+00	3.340-04	1.282+00	2.462-03	3.077+00
20000.	4.618+00	1.879-04	1.028+00	1.808-03	3.588+00
30000.	5.160+00	8.354-05	7.477-01	1.180-03	4.411+00
40000.	5.538+00	4.700-05	5.936-01	8.760-04	4.943+00
50000.	5.789+00	3.008-05	4.951-01	6.964-04	5.294+00
60000.	5.981+00	2.089-05	4.263-01	5.779-04	5.554+00
80000.	6.315+00	1.175-05	3.359-01	4.312-04	5.978+00
100000.	6.661+00	7.521-06	2.787-01	3.438-04	6.382+00

Z= 35 BROMINE

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.188+08	8.149+02	1.229-04	1.188+08
.015	3.719+07	8.149+02	2.762-04	3.719+07
.020	1.435+07	8.149+02	4.902-04	1.435+07
.030	3.196+06	8.148+02	1.099-03	3.195+06
.040	1.048+06	8.148+02	1.948-03	1.047+06
.050	5.115+05	8.147+02	3.033-03	5.107+05
.060	3.662+05	8.147+02	4.353-03	3.654+05
.080	8.906+05	8.146+02	7.687-03	8.898+05
.100	4.086+06	8.144+02	1.193-02	4.085+06
.150	6.379+06	8.138+02	2.639-02	6.378+06
.200	5.397+06	8.130+02	4.611-02	5.396+06
.300	3.287+06	8.107+02	1.001-01	3.286+06
.400	2.079+06	8.075+02	1.715-01	2.079+06
.500	1.397+06	8.036+02	2.579-01	1.396+06
.600	9.853+05	7.990+02	3.569-01	9.845+05
.800	5.441+05	7.876+02	5.829-01	5.433+05
1.000	3.361+05	7.739+02	8.304-01	3.353+05
1.500	1.333+05	7.317+02	1.465+00	1.326+05
2.000	4.563+05	6.829+02	2.103+00	4.556+05
3.000	1.628+05	5.880+02	3.342+00	1.622+05
4.000	7.597+04	5.104+02	4.473+00	7.546+04
5.000	4.172+04	4.466+02	5.492+00	4.127+04
6.000	2.550+04	3.927+02	6.409+00	2.511+04
8.000	1.171+04	3.078+02	7.986+00	1.140+04
10.000	6.407+03	2.451+02	9.287+00	6.152+03
15.000	1.497+04	1.488+02	1.167+01	1.481+04
20.000	7.022+03	1.016+02	1.327+01	6.908+03
30.000	2.322+03	5.729+01	1.508+01	2.249+03
40.000	1.046+03	3.627+01	1.597+01	9.936+02

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.640+02	2.489+01	1.635+01	5.228+02	
60.	3.424+02	1.810+01	1.645+01	3.078+02	
80.	1.593+02	1.078+01	1.626+01	1.323+02	
100.	9.113+01	7.135+00	1.595+01	6.805+01	
150.	3.827+01	3.316+00	1.487+01	2.009+01	
200.	2.421+01	1.907+00	1.383+01	8.465+00	
300.	1.561+01	8.663-01	1.219+01	2.557+00	
400.	1.261+01	4.926-01	1.098+01	1.136+00	
500.	1.100+01	3.174-01	1.005+01	6.310-01	
600.	9.940+00	2.214-01	9.316+00	4.023-01	
800.	8.529+00	1.252-01	8.197+00	2.071-01	
1000.	7.585+00	8.038-02	7.375+00	1.288-01	
1500.	6.155+00	3.588-02	5.999+00	5.932-02	6.120-02
2000.	5.425+00	2.023-02	5.120+00	3.643-02	2.486-01
3000.	4.688+00	9.009-03	4.027+00	1.971-02	6.321-01
4000.	4.370+00	5.073-03	3.358+00	1.329-02	9.934-01
5000.	4.238+00	3.249-03	2.899+00	9.967-03	1.326+00
6000.	4.202+00	2.257-03	2.562+00	7.956-03	1.630+00
8000.	4.261+00	1.270-03	2.096+00	5.655-03	2.158+00
10000.	4.384+00	8.133-04	1.784+00	4.381-03	2.595+00
15000.	4.706+00	3.616-04	1.320+00	2.798-03	3.383+00
20000.	4.966+00	2.035-04	1.058+00	2.055-03	3.905+00
30000.	5.400+00	9.044-05	7.697-01	1.341-03	4.629+00
40000.	5.765+00	5.088-05	6.111-01	9.952-04	5.153+00
50000.	6.066+00	3.257-05	5.097-01	7.911-04	5.555+00
60000.	6.313+00	2.262-05	4.389-01	6.565-04	5.874+00
80000.	6.697+00	1.272-05	3.458-01	4.898-04	6.350+00
100000.	6.985+00	8.142-06	2.869-01	3.906-04	6.698+00

Z= 36 KRYPTON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	3.613+08	8.621+02	1.089-04	3.613+08
.015	4.782+07	8.621+02	2.448-04	4.782+07
.020	1.028+07	8.621+02	4.345-04	1.028+07
.030	1.678+06	8.621+02	9.746-04	1.677+06
.040	1.096+06	8.620+02	1.727-03	1.095+06
.050	9.656+05	8.620+02	2.691-03	9.648+05
.060	8.562+05	8.619+02	3.863-03	8.553+05
.080	6.571+05	8.618+02	6.825-03	6.563+05
.100	9.776+05	8.616+02	1.060-02	9.768+05
.150	4.300+06	8.610+02	2.348-02	4.299+06
.200	4.437+06	8.602+02	4.108-02	4.437+06
.300	3.091+06	8.580+02	8.946-02	3.091+06
.400	2.072+06	8.549+02	1.538-01	2.071+06
.500	1.444+06	8.509+02	2.321-01	1.443+06
.600	1.048+06	8.463+02	3.224-01	1.047+06
.800	6.066+05	8.348+02	5.313-01	6.057+05
1.000	3.862+05	8.208+02	7.647-01	3.854+05
1.500	1.564+05	7.768+02	1.390+00	1.556+05
2.000	4.998+05	7.252+02	2.048+00	4.991+05
3.000	1.828+05	6.239+02	3.365+00	1.822+05
4.000	8.556+04	5.406+02	4.563+00	8.501+04
5.000	4.688+04	4.723+02	5.624+00	4.640+04
6.000	2.856+04	4.151+02	6.567+00	2.814+04
8.000	1.305+04	3.264+02	8.167+00	1.272+04
10.000	7.134+03	2.614+02	9.486+00	6.863+03
15.000	1.644+04	1.602+02	1.191+01	1.627+04
20.000	7.762+03	1.090+02	1.356+01	7.640+03
30.000	2.576+03	6.113+01	1.543+01	2.500+03
40.000	1.161+03	3.856+01	1.636+01	1.106+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	6.255+02	2.640+01	1.676+01	5.823+02	
60.	3.792+02	1.917+01	1.687+01	3.431+02	
80.	1.757+02	1.139+01	1.668+01	1.477+02	
100.	1.000+02	7.532+00	1.637+01	7.614+01	
150.	4.139+01	3.495+00	1.529+01	2.261+01	
200.	2.580+01	2.008+00	1.423+01	9.558+00	
300.	1.635+01	9.116-01	1.254+01	2.900+00	
400.	1.311+01	5.182-01	1.130+01	1.292+00	
500.	1.140+01	3.338-01	1.034+01	7.192-01	
600.	1.028+01	2.328-01	9.584+00	4.591-01	
800.	8.800+00	1.316-01	8.432+00	2.365-01	
1000.	7.818+00	8.450-02	7.587+00	1.470-01	
1500.	6.341+00	3.771-02	6.171+00	6.755-02	6.539-02
2000.	5.585+00	2.126-02	5.266+00	4.142-02	2.558-01
3000.	4.844+00	9.468-03	4.142+00	2.237-02	6.700-01
4000.	4.541+00	5.331-03	3.454+00	1.506-02	1.067+00
5000.	4.425+00	3.414-03	2.982+00	1.129-02	1.428+00
6000.	4.397+00	2.372-03	2.636+00	9.012-03	1.750+00
8000.	4.454+00	1.335-03	2.156+00	6.403-03	2.290+00
10000.	4.556+00	8.546-04	1.835+00	4.959-03	2.715+00
15000.	4.834+00	3.800-04	1.357+00	3.167-03	3.473+00
20000.	5.122+00	2.138-04	1.089+00	2.325-03	4.031+00
30000.	5.668+00	9.503-05	7.917-01	1.517-03	4.875+00
40000.	6.077+00	5.346-05	6.285-01	1.126-03	5.447+00
50000.	6.376+00	3.422-05	5.243-01	8.951-04	5.851+00
60000.	6.614+00	2.376-05	4.514-01	7.427-04	6.162+00
80000.	7.007+00	1.337-05	3.556-01	5.541-04	6.651+00
100000.	7.364+00	8.555-06	2.951-01	4.419-04	7.069+00

Z= 37 RUBIDIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	7.812+03	9.107+02	1.404-04	6.901+03	
.015	1.447+04	9.106+02	3.153-04	1.356+04	
.020	1.430+04	9.106+02	5.595-04	1.339+04	
.030	1.071+04	9.106+02	1.255-03	9.801+03	
.040	2.138+06	9.105+02	2.223-03	2.138+06	
.050	9.584+05	9.105+02	3.461-03	9.575+05	
.060	5.734+05	9.104+02	4.967-03	5.725+05	
.080	3.327+05	9.101+02	8.770-03	3.318+05	
.100	2.514+05	9.098+02	1.361-02	2.505+05	
.150	2.355+06	9.088+02	3.008-02	2.354+06	
.200	3.650+06	9.075+02	5.253-02	3.649+06	
.300	3.125+06	9.037+02	1.139-01	3.124+06	
.400	2.240+06	8.987+02	1.949-01	2.239+06	
.500	1.611+06	8.926+02	2.927-01	1.610+06	
.600	1.189+06	8.855+02	4.044-01	1.188+06	
.800	6.994+05	8.692+02	6.583-01	6.985+05	
1.000	4.446+05	8.508+02	9.341-01	4.437+05	
1.500	1.756+05	8.012+02	1.629+00	1.748+05	
2.000	4.795+05	7.495+02	2.311+00	4.788+05	
3.000	2.023+05	6.511+02	3.611+00	2.017+05	
4.000	9.530+04	5.667+02	4.788+00	9.473+04	
5.000	5.234+04	4.954+02	5.842+00	5.183+04	
6.000	3.191+04	4.357+02	6.788+00	3.146+04	
8.000	1.458+04	3.438+02	8.405+00	1.422+04	
10.000	7.960+03	2.769+02	9.735+00	7.674+03	
15.000	2.703+03	1.718+02	1.217+01	2.519+03	
20.000	8.524+03	1.161+02	1.382+01	8.394+03	
30.000	2.854+03	6.575+01	1.576+01	2.772+03	
40.000	1.289+03	4.176+01	1.672+01	1.230+03	
50.	6.946+02	2.873+01	1.715+01	6.487+02	
60.	4.207+02	2.092+01	1.727+01	3.825+02	
80.	1.944+02	1.248+01	1.710+01	1.648+02	
100.	1.102+02	8.275+00	1.679+01	8.511+01	
150.	4.492+01	3.852+00	1.568+01	2.539+01	
200.	2.759+01	2.217+00	1.460+01	1.078+01	
300.	1.717+01	1.008+00	1.288+01	3.288+00	
400.	1.365+01	5.735-01	1.160+01	1.469+00	
500.	1.181+01	3.695-01	1.063+01	8.182-01	
600.	1.063+01	2.578-01	9.846+00	5.221-01	
800.	9.079+00	1.458-01	8.664+00	2.690-01	
1000.	8.057+00	9.365-02	7.796+00	1.673-01	
1500.	6.530+00	4.181-02	6.341+00	7.688-02	6.974-02
2000.	5.750+00	2.357-02	5.412+00	4.712-02	2.666-01
3000.	4.999+00	1.050-02	4.257+00	2.542-02	7.066-01
4000.	4.706+00	5.913-03	3.550+00	1.710-02	1.133+00
5000.	4.603+00	3.787-03	3.065+00	1.281-02	1.521+00
6000.	4.588+00	2.631-03	2.709+00	1.021-02	1.866+00
8000.	4.660+00	1.481-03	2.215+00	7.250-03	2.436+00
10000.	4.766+00	9.479-04	1.886+00	5.611-03	2.874+00
15000.	5.031+00	4.215-04	1.395+00	3.580-03	3.632+00
20000.	5.321+00	2.371-04	1.119+00	2.627-03	4.199+00
30000.	5.916+00	1.054-04	8.137-01	1.713-03	5.100+00
40000.	6.365+00	5.930-05	6.460-01	1.271-03	5.717+00
50000.	6.685+00	3.796-05	5.388-01	1.010-03	6.145+00
60000.	6.932+00	2.636-05	4.639-01	8.381-04	6.467+00
80000.	7.336+00	1.483-05	3.655-01	6.251-04	6.970+00
100000.	7.707+00	9.491-06	3.033-01	4.985-04	7.404+00

Z= 38 STRONTIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.979+03	9.605+02	1.737-04	1.018+03	
.015	2.880+04	9.605+02	3.901-04	2.784+04	
.020	5.569+04	9.605+02	6.922-04	5.473+04	
.030	8.342+06	9.605+02	1.552-03	8.341+06	
.040	2.626+06	9.604+02	2.749-03	2.625+06	
.050	1.200+06	9.603+02	4.279-03	1.199+06	
.060	7.534+05	9.602+02	6.139-03	7.524+05	
.080	5.234+05	9.599+02	1.083-02	5.224+05	
.100	4.713+05	9.595+02	1.680-02	4.703+05	
.150	2.297+06	9.583+02	3.710-02	2.296+06	
.200	4.566+06	9.566+02	6.469-02	4.565+06	
.300	4.108+06	9.519+02	1.399-01	4.107+06	
.400	2.945+06	9.457+02	2.387-01	2.944+06	
.500	2.098+06	9.383+02	3.573-01	2.097+06	
.600	1.527+06	9.297+02	4.919-01	1.526+06	
.800	8.663+05	9.101+02	7.943-01	8.653+05	
1.000	5.223+05	8.887+02	1.116+00	5.214+05	
1.500	1.939+05	8.337+02	1.889+00	1.930+05	
2.000	3.782+05	7.790+02	2.605+00	3.775+05	
3.000	2.228+05	6.777+02	3.900+00	2.222+05	
4.000	1.053+05	5.912+02	5.059+00	1.047+05	
5.000	5.815+04	5.181+02	6.103+00	5.763+04	
6.000	3.566+04	4.566+02	7.043+00	3.520+04	
8.000	1.644+04	3.614+02	8.660+00	1.607+04	
10.000	9.010+03	2.921+02	9.996+00	8.708+03	
15.000	3.019+03	1.834+02	1.245+01	2.823+03	
20.000	9.353+03	1.237+02	1.413+01	9.215+03	
30.000	3.149+03	7.006+01	1.609+01	3.063+03	
40.000	1.423+03	4.452+01	1.709+01	1.361+03	
50.	7.661+02	3.064+01	1.754+01	7.180+02	
60.	4.633+02	2.232+01	1.769+01	4.233+02	
80.	2.133+02	1.332+01	1.752+01	1.824+02	
100.	1.205+02	8.834+00	1.721+01	9.443+01	
150.	4.849+01	4.113+00	1.609+01	2.828+01	
200.	2.938+01	2.368+00	1.499+01	1.202+01	
300.	1.798+01	1.077+00	1.322+01	3.677+00	
400.	1.418+01	6.126-01	1.192+01	1.649+00	
500.	1.223+01	3.948-01	1.091+01	9.226-01	
600.	1.098+01	2.754-01	1.011+01	5.910-01	
800.	9.360+00	1.558-01	8.899+00	3.054-01	
1000.	8.297+00	1.000-01	8.007+00	1.900-01	
1500.	6.719+00	4.467-02	6.513+00	8.715-02	7.406-02
2000.	5.923+00	2.518-02	5.559+00	5.330-02	2.862-01
3000.	5.160+00	1.122-02	4.372+00	2.868-02	7.482-01
4000.	4.862+00	6.317-03	3.646+00	1.927-02	1.191+00
5000.	4.761+00	4.046-03	3.148+00	1.442-02	1.595+00
6000.	4.751+00	2.811-03	2.782+00	1.149-02	1.955+00
8000.	4.842+00	1.582-03	2.275+00	8.153-03	2.557+00
10000.	4.974+00	1.013-03	1.937+00	6.309-03	3.029+00
15000.	5.300+00	4.503-04	1.433+00	4.023-03	3.863+00
20000.	5.629+00	2.534-04	1.149+00	2.952-03	4.476+00
30000.	6.257+00	1.126-04	8.357-01	1.925-03	5.419+00
40000.	6.731+00	6.336-05	6.635-01	1.428-03	6.066+00
50000.	7.075+00	4.056-05	5.534-01	1.135-03	6.520+00
60000.	7.342+00	2.817-05	4.765-01	9.417-04	6.865+00
80000.	7.770+00	1.584-05	3.754-01	7.024-04	7.394+00
100000.	8.143+00	1.014-05	3.115-01	5.601-04	7.831+00

Z= 39 YTTRIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.077+06	1.012+03	1.802-04	4.076+06	
.015	6.208+06	1.012+03	4.048-04	6.207+06	
.020	6.388+06	1.012+03	7.184-04	6.387+06	
.030	4.769+06	1.012+03	1.610-03	4.768+06	
.040	2.265+06	1.012+03	2.853-03	2.264+06	
.050	1.625+06	1.012+03	4.441-03	1.624+06	
.060	1.310+06	1.011+03	6.371-03	1.309+06	
.080	9.310+05	1.011+03	1.124-02	9.300+05	
.100	6.960+05	1.011+03	1.744-02	6.950+05	
.150	3.860+05	1.009+03	3.850-02	3.850+05	
.200	3.139+06	1.008+03	6.713-02	3.138+06	
.300	3.327+06	1.003+03	1.452-01	3.326+06	
.400	2.614+06	9.967+02	2.476-01	2.613+06	
.500	1.969+06	9.890+02	3.707-01	1.968+06	
.600	1.493+06	9.802+02	5.103-01	1.492+06	
.800	9.029+05	9.600+02	8.240-01	9.019+05	
1.000	5.693+05	9.376+02	1.158+00	5.683+05	
1.500	2.191+05	8.791+02	1.958+00	2.182+05	
2.000	1.089+05	8.201+02	2.698+00	1.081+05	
3.000	2.446+05	7.108+02	4.033+00	2.438+05	
4.000	1.171+05	6.192+02	5.222+00	1.165+05	
5.000	6.488+04	5.429+02	6.288+00	6.433+04	
6.000	3.975+04	4.789+02	7.245+00	3.926+04	
8.000	1.824+04	3.801+02	8.885+00	1.785+04	
10.000	9.955+03	3.082+02	1.024+01	9.637+03	
15.000	3.341+03	1.957+02	1.273+01	3.132+03	
20.000	1.019+04	1.315+02	1.444+01	1.004+04	
30.000	3.461+03	7.443+01	1.644+01	3.370+03	
40.000	1.568+03	4.726+01	1.747+01	1.504+03	
50.	8.450+02	3.251+01	1.794+01	7.945+02	
60.	5.108+02	2.367+01	1.810+01	4.691+02	
80.	2.347+02	1.412+01	1.794+01	2.026+02	
100.	1.321+02	9.360+00	1.763+01	1.051+02	
150.	5.251+01	4.356+00	1.651+01	3.165+01	
200.	3.140+01	2.507+00	1.538+01	1.351+01	
300.	1.886+01	1.140+00	1.357+01	4.153+00	
400.	1.474+01	6.485-01	1.223+01	1.865+00	
500.	1.266+01	4.179-01	1.120+01	1.042+00	
600.	1.134+01	2.915-01	1.038+01	6.663-01	
800.	9.642+00	1.649-01	9.133+00	3.440-01	
1000.	8.538+00	1.059-01	8.218+00	2.140-01	
1500.	6.908+00	4.727-02	6.684+00	9.825-02	7.841-02
2000.	6.107+00	2.665-02	5.705+00	6.011-02	3.152-01
3000.	5.326+00	1.187-02	4.487+00	3.234-02	7.947-01
4000.	5.013+00	6.685-03	3.742+00	2.171-02	1.243+00
5000.	4.904+00	4.281-03	3.231+00	1.624-02	1.653+00
6000.	4.898+00	2.974-03	2.855+00	1.294-02	2.026+00
8000.	5.020+00	1.674-03	2.335+00	9.168-03	2.674+00
10000.	5.203+00	1.072-03	1.988+00	7.090-03	3.207+00
15000.	5.641+00	4.765-04	1.470+00	4.517-03	4.166+00
20000.	5.984+00	2.681-04	1.179+00	3.312-03	4.801+00
30000.	6.544+00	1.192-04	8.577-01	2.159-03	5.684+00
40000.	7.006+00	6.705-05	6.809-01	1.601-03	6.324+00
50000.	7.383+00	4.292-05	5.679-01	1.272-03	6.814+00
60000.	7.690+00	2.980-05	4.890-01	1.055-03	7.200+00
80000.	8.161+00	1.677-05	3.853-01	7.870-04	7.775+00
100000.	8.510+00	1.073-05	3.197-01	6.275-04	8.190+00

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 40 ZIRCONIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	7.105+06	1.064+03	1.865-04	7.104+06	
.015	8.950+06	1.064+03	4.189-04	8.949+06	
.020	7.349+06	1.064+03	7.433-04	7.348+06	
.030	4.605+06	1.064+03	1.666-03	4.604+06	
.040	3.089+06	1.064+03	2.951-03	3.088+06	
.050	2.222+06	1.064+03	4.594-03	2.221+06	
.060	1.685+06	1.064+03	6.591-03	1.684+06	
.080	1.083+06	1.064+03	1.163-02	1.082+06	
.100	7.687+05	1.063+03	1.804-02	7.677+05	
.150	4.171+05	1.062+03	3.982-02	4.160+05	
.200	8.705+05	1.060+03	6.942-02	8.694+05	
.300	2.524+06	1.056+03	1.501-01	2.523+06	
.400	2.610+06	1.049+03	2.559-01	2.608+06	
.500	2.175+06	1.042+03	3.829-01	2.174+06	
.600	1.724+06	1.033+03	5.269-01	1.723+06	
.800	1.062+06	1.012+03	8.498-01	1.061+06	
1.000	6.637+05	9.895+02	1.192+00	6.627+05	
1.500	2.504+05	9.284+02	2.009+00	2.495+05	
2.000	1.224+05	8.654+02	2.758+00	1.215+05	
3.000	2.680+05	7.479+02	4.103+00	2.673+05	
4.000	1.284+05	6.503+02	5.310+00	1.277+05	
5.000	7.128+04	5.696+02	6.402+00	7.070+04	
6.000	4.378+04	5.024+02	7.389+00	4.327+04	
8.000	2.018+04	3.994+02	9.087+00	1.977+04	
10.000	1.105+04	3.248+02	1.047+01	1.072+04	
15.000	3.715+03	2.076+02	1.298+01	3.495+03	
20.000	1.109+04	1.397+02	1.470+01	1.094+04	
30.000	3.775+03	7.900+01	1.676+01	3.679+03	
40.000	1.714+03	5.011+01	1.783+01	1.646+03	
50.	9.249+02	3.443+01	1.832+01	8.722+02	
60.	5.599+02	2.506+01	1.849+01	5.163+02	
80.	2.574+02	1.494+01	1.834+01	2.241+02	
100.	1.447+02	9.896+00	1.805+01	1.168+02	
150.	5.687+01	4.603+00	1.690+01	3.537+01	
200.	3.353+01	2.648+00	1.575+01	1.514+01	
300.	1.977+01	1.204+00	1.390+01	4.662+00	
400.	1.531+01	6.846-01	1.253+01	2.096+00	
500.	1.309+01	4.411-01	1.148+01	1.172+00	
600.	1.170+01	3.077-01	1.064+01	7.494-01	
800.	9.925+00	1.740-01	9.364+00	3.869-01	
1000.	8.779+00	1.117-01	8.427+00	2.407-01	
1500.	7.099+00	4.989-02	6.855+00	1.105-01	8.402-02
2000.	6.263+00	2.812-02	5.851+00	6.752-02	3.164-01
3000.	5.484+00	1.253-02	4.602+00	3.628-02	8.335-01
4000.	5.202+00	7.054-03	3.838+00	2.433-02	1.333+00
5000.	5.123+00	4.518-03	3.313+00	1.819-02	1.787+00
6000.	5.135+00	3.139-03	2.928+00	1.448-02	2.189+00
8000.	5.259+00	1.766-03	2.395+00	1.026-02	2.852+00
10000.	5.408+00	1.131-03	2.039+00	7.929-03	3.360+00
15000.	5.752+00	5.028-04	1.508+00	5.049-03	4.239+00
20000.	6.117+00	2.829-04	1.210+00	3.701-03	4.903+00
30000.	6.852+00	1.258-04	8.797-01	2.411-03	5.970+00
40000.	7.401+00	7.075-05	6.984-01	1.788-03	6.701+00
50000.	7.789+00	4.528-05	5.825-01	1.420-03	7.205+00
60000.	8.085+00	3.145-05	5.016-01	1.178-03	7.582+00
80000.	8.560+00	1.769-05	3.952-01	8.787-04	8.164+00
100000.	8.989+00	1.132-05	3.279-01	7.005-04	8.660+00

Z= 41 NIOBIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	8.066+06	1.118+03	1.626-04	8.065+06	
.015	1.662+07	1.118+03	3.651-04	1.662+07	
.020	1.031+07	1.118+03	6.480-04	1.031+07	
.030	4.520+06	1.118+03	1.453-03	4.519+06	
.040	2.587+06	1.118+03	2.574-03	2.586+06	
.050	1.767+06	1.118+03	4.007-03	1.766+06	
.060	1.345+06	1.118+03	5.750-03	1.344+06	
.080	9.309+05	1.118+03	1.015-02	9.298+05	
.100	7.281+05	1.117+03	1.574-02	7.270+05	
.150	4.886+05	1.116+03	3.478-02	4.875+05	
.200	3.741+05	1.115+03	6.070-02	3.730+05	
.300	3.271+06	1.110+03	1.315-01	3.270+06	
.400	3.244+06	1.105+03	2.246-01	3.243+06	
.500	2.649+06	1.098+03	3.368-01	2.648+06	
.600	2.065+06	1.090+03	4.646-01	2.064+06	
.800	1.229+06	1.071+03	7.535-01	1.228+06	
1.000	7.487+05	1.049+03	1.064+00	7.476+05	
1.500	2.751+05	9.881+02	1.831+00	2.741+05	
2.000	1.344+05	9.218+02	2.566+00	1.335+05	
3.000	2.933+05	7.949+02	3.945+00	2.925+05	
4.000	1.414+05	6.887+02	5.205+00	1.407+05	
5.000	7.859+04	6.010+02	6.352+00	7.798+04	
6.000	4.823+04	5.288+02	7.394+00	4.770+04	
8.000	2.216+04	4.202+02	9.187+00	2.173+04	
10.000	1.210+04	3.428+02	1.064+01	1.175+04	
15.000	4.055+03	2.207+02	1.322+01	3.821+03	
20.000	1.202+04	1.484+02	1.497+01	1.185+04	
30.000	4.116+03	8.388+01	1.709+01	4.015+03	
40.000	1.875+03	5.314+01	1.819+01	1.804+03	
50.	1.014+03	3.649+01	1.872+01	9.589+02	
60.	6.145+02	2.655+01	1.891+01	5.690+02	
80.	2.823+02	1.581+01	1.875+01	2.477+02	
100.	1.581+02	1.047+01	1.846+01	1.292+02	
150.	6.134+01	4.867+00	1.730+01	3.917+01	
200.	3.571+01	2.799+00	1.613+01	1.678+01	
300.	2.070+01	1.272+00	1.424+01	5.182+00	
400.	1.590+01	7.234-01	1.284+01	2.334+00	
500.	1.354+01	4.660-01	1.177+01	1.307+00	
600.	1.207+01	3.250-01	1.090+01	8.373-01	
800.	1.022+01	1.838-01	9.598+00	4.337-01	
1000.	9.026+00	1.180-01	8.637+00	2.704-01	
1500.	7.294+00	5.269-02	7.026+00	1.245-01	9.019-02
2000.	6.433+00	2.970-02	5.997+00	7.618-02	3.298-01
3000.	5.647+00	1.323-02	4.717+00	4.091-02	8.763-01
4000.	5.378+00	7.450-03	3.933+00	2.740-02	1.409+00
5000.	5.315+00	4.771-03	3.396+00	2.046-02	1.894+00
6000.	5.343+00	3.315-03	3.002+00	1.627-02	2.321+00
8000.	5.485+00	1.866-03	2.455+00	1.151-02	3.016+00
10000.	5.637+00	1.194-03	2.090+00	8.883-03	3.536+00
15000.	5.964+00	5.311-04	1.546+00	5.646-03	4.412+00
20000.	6.332+00	2.988-04	1.240+00	4.134-03	5.088+00
30000.	7.128+00	1.328-04	9.017-01	2.691-03	6.223+00
40000.	7.724+00	7.472-05	7.158-01	1.994-03	7.006+00
50000.	8.132+00	4.783-05	5.971-01	1.584-03	7.533+00
60000.	8.434+00	3.321-05	5.141-01	1.313-03	7.918+00
80000.	8.908+00	1.868-05	4.050-01	9.790-04	8.502+00
100000.	9.340+00	1.196-05	3.360-01	7.804-04	9.003+00

Z= 42 MOLYBDENUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.232+07	1.173+03	1.599-04	1.232+07	
.015	1.605+07	1.173+03	3.592-04	1.604+07	
.020	1.073+07	1.173+03	6.375-04	1.072+07	
.030	5.465+06	1.173+03	1.429-03	5.464+06	
.040	3.428+06	1.173+03	2.532-03	3.427+06	
.050	2.445+06	1.173+03	3.942-03	2.444+06	
.060	1.888+06	1.173+03	5.657-03	1.887+06	
.080	1.293+06	1.173+03	9.986-03	1.292+06	
.100	9.839+05	1.173+03	1.549-02	9.828+05	
.150	6.194+05	1.171+03	3.423-02	6.183+05	
.200	4.538+05	1.170+03	5.975-02	4.527+05	
.300	2.910+06	1.166+03	1.294-01	2.909+06	
.400	3.081+06	1.160+03	2.212-01	3.079+06	
.500	2.584+06	1.154+03	3.318-01	2.583+06	
.600	2.048+06	1.146+03	4.579-01	2.047+06	
.800	1.253+06	1.127+03	7.432-01	1.252+06	
1.000	7.860+05	1.105+03	1.051+00	7.849+05	
1.500	3.073+05	1.042+03	1.813+00	3.063+05	
2.000	1.527+05	9.729+02	2.549+00	1.517+05	
3.000	3.169+05	8.390+02	3.941+00	3.161+05	
4.000	1.546+05	7.260+02	5.222+00	1.538+05	
5.000	8.639+04	6.324+02	6.394+00	8.575+04	
6.000	5.319+04	5.556+02	7.464+00	5.263+04	
8.000	2.452+04	4.412+02	9.313+00	2.407+04	
10.000	1.341+04	3.603+02	1.081+01	1.304+04	
15.000	4.495+03	2.320+02	1.347+01	4.249+03	
20.000	1.305+04	1.575+02	1.527+01	1.288+04	
30.000	4.483+03	8.898+01	1.744+01	4.377+03	
40.000	2.046+03	5.631+01	1.857+01	1.971+03	
50.	1.107+03	3.863+01	1.911+01	1.050+03	
60.	6.713+02	2.808+01	1.931+01	6.239+02	
80.	3.084+02	1.671+01	1.917+01	2.725+02	
100.	1.724+02	1.106+01	1.887+01	1.425+02	
150.	6.632+01	5.137+00	1.770+01	4.348+01	
200.	3.817+01	2.953+00	1.651+01	1.871+01	
300.	2.173+01	1.341+00	1.459+01	5.803+00	
400.	1.653+01	7.627-01	1.316+01	2.615+00	
500.	1.400+01	4.913-01	1.205+01	1.460+00	
600.	1.245+01	3.426-01	1.117+01	9.407-01	
800.	1.051+01	1.938-01	9.831+00	4.857-01	
1000.	9.274+00	1.244-01	8.848+00	3.024-01	
1500.	7.487+00	5.553-02	7.198+00	1.390-01	9.441-02
2000.	6.624+00	3.130-02	6.143+00	8.495-02	3.648-01
3000.	5.815+00	1.394-02	4.832+00	4.557-02	9.237-01
4000.	5.516+00	7.851-03	4.029+00	3.051-02	1.448+00
5000.	5.432+00	5.028-03	3.479+00	2.276-02	1.925+00
6000.	5.452+00	3.493-03	3.075+00	1.810-02	2.355+00
8000.	5.618+00	1.966-03	2.515+00	1.279-02	3.089+00
10000.	5.834+00	1.259-03	2.141+00	9.873-03	3.682+00
15000.	6.342+00	5.596-04	1.583+00	6.273-03	4.752+00
20000.	6.776+00	3.149-04	1.270+00	4.592-03	5.501+00
30000.	7.508+00	1.400-04	9.237-01	2.988-03	6.581+00
40000.	8.071+00	7.874-05	7.333-01	2.214-03	7.335+00
50000.	8.503+00	5.040-05	6.116-01	1.758-03	7.890+00
60000.	8.850+00	3.500-05	5.266-01	1.458-03	8.322+00
80000.	9.394+00	1.969-05	4.149-01	1.087-03	8.978+00
100000.	9.833+00	1.260-05	3.442-01	8.663-04	9.488+00

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 43 TECHNETIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.435+07	1.230+03	1.876-04	1.434+07
.015	1.185+07	1.230+03	4.212-04	1.185+07
.020	1.170+07	1.230+03	7.475-04	1.170+07
.030	8.556+06	1.230+03	1.676-03	8.554+06
.040	6.033+06	1.230+03	2.968-03	6.032+06
.050	4.408+06	1.230+03	4.620-03	4.406+06
.060	3.346+06	1.230+03	6.628-03	3.345+06
.080	2.116+06	1.229+03	1.170-02	2.115+06
.100	1.464+06	1.229+03	1.814-02	1.463+06
.150	7.395+05	1.228+03	4.003-02	7.382+05
.200	4.549+05	1.226+03	6.980-02	4.537+05
.300	3.581+06	1.222+03	1.509-01	3.580+06
.400	3.548+06	1.216+03	2.572-01	3.547+06
.500	2.907+06	1.208+03	3.847-01	2.905+06
.600	2.275+06	1.199+03	5.293-01	2.274+06
.800	1.371+06	1.179+03	8.533-01	1.370+06
1.000	8.583+05	1.155+03	1.196+00	8.571+05
1.500	3.402+05	1.089+03	2.012+00	3.391+05
2.000	1.710+05	1.016+03	2.760+00	1.700+05
3.000	3.099+05	8.770+02	4.115+00	3.090+05
4.000	1.680+05	7.594+02	5.368+00	1.672+05
5.000	9.418+04	6.618+02	6.536+00	9.351+04
6.000	5.812+04	5.817+02	7.618+00	5.753+04
8.000	2.687+04	4.621+02	9.510+00	2.640+04
10.000	1.472+04	3.777+02	1.104+01	1.433+04
15.000	4.936+03	2.445+02	1.373+01	4.677+03
20.000	2.277+03	1.665+02	1.555+01	2.095+03
30.000	4.886+03	9.396+01	1.775+01	4.774+03
40.000	2.238+03	5.936+01	1.892+01	2.160+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.212+03	4.068+01	1.949+01	1.151+03	
60.	7.335+02	2.954+01	1.971+01	6.843+02	
80.	3.357+02	1.756+01	1.958+01	2.986+02	
100.	1.871+02	1.161+01	1.930+01	1.562+02	
150.	7.125+01	5.390+00	1.812+01	4.775+01	
200.	4.056+01	3.097+00	1.690+01	2.056+01	
300.	2.273+01	1.406+00	1.493+01	6.392+00	
400.	1.716+01	7.993-01	1.347+01	2.892+00	
500.	1.448+01	5.148-01	1.234+01	1.622+00	
600.	1.283+01	3.590-01	1.144+01	1.039+00	
800.	1.081+01	2.030-01	1.007+01	5.374-01	
1000.	9.523+00	1.303-01	9.058+00	3.344-01	
1500.	7.681+00	5.817-02	7.369+00	1.533-01	1.006-01
2000.	6.789+00	3.279-02	6.290+00	9.355-02	3.730-01
3000.	5.981+00	1.460-02	4.947+00	5.012-02	9.690-01
4000.	5.707+00	8.222-03	4.125+00	3.356-02	1.540+00
5000.	5.649+00	5.266-03	3.562+00	2.505-02	2.057+00
6000.	5.688+00	3.658-03	3.148+00	1.993-02	2.516+00
8000.	5.864+00	2.059-03	2.575+00	1.410-02	3.274+00
10000.	6.061+00	1.318-03	2.192+00	1.089-02	3.857+00
15000.	6.500+00	5.860-04	1.621+00	6.923-03	4.872+00
20000.	6.939+00	3.297-04	1.300+00	5.071-03	5.633+00
30000.	7.789+00	1.466-04	9.457-01	3.302-03	6.840+00
40000.	8.422+00	8.246-05	7.508-01	2.447-03	7.668+00
50000.	8.870+00	5.277-05	6.262-01	1.944-03	8.241+00
60000.	9.212+00	3.665-05	5.392-01	1.612-03	8.672+00
80000.	9.758+00	2.062-05	4.248-01	1.202-03	9.332+00
100000.	1.024+01	1.320-05	3.524-01	9.584-04	9.887+00

Z= 44 RUTHENIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.924+07	1.288+03	1.617-04	1.924+07
.015	1.164+07	1.288+03	3.631-04	1.164+07
.020	1.285+07	1.288+03	6.444-04	1.285+07
.030	1.034+07	1.288+03	1.445-03	1.034+07
.040	7.616+06	1.288+03	2.560-03	7.614+06
.050	5.723+06	1.288+03	3.985-03	5.722+06
.060	4.441+06	1.288+03	5.719-03	4.439+06
.080	2.906+06	1.287+03	1.009-02	2.905+06
.100	2.067+06	1.287+03	1.566-02	2.066+06
.150	1.105+06	1.286+03	3.460-02	1.103+06
.200	7.107+05	1.284+03	6.039-02	7.094+05
.300	2.284+06	1.281+03	1.308-01	2.283+06
.400	2.965+06	1.275+03	2.235-01	2.964+06
.500	2.788+06	1.268+03	3.352-01	2.786+06
.600	2.355+06	1.261+03	4.625-01	2.354+06
.800	1.544+06	1.242+03	7.505-01	1.543+06
1.000	9.912+05	1.220+03	1.061+00	9.899+05
1.500	3.842+05	1.154+03	1.828+00	3.831+05
2.000	1.883+05	1.081+03	2.569+00	1.872+05
3.000	3.251+05	9.344+02	3.976+00	3.242+05
4.000	1.822+05	8.073+02	5.291+00	1.814+05
5.000	1.031+05	7.007+02	6.513+00	1.023+05
6.000	6.382+04	6.136+02	7.641+00	6.320+04
8.000	2.954+04	4.858+02	9.609+00	2.905+04
10.000	1.616+04	3.970+02	1.120+01	1.575+04
15.000	5.402+03	2.571+02	1.397+01	5.131+03
20.000	2.499+03	1.764+02	1.585+01	2.307+03
30.000	5.285+03	9.932+01	1.811+01	5.168+03
40.000	2.435+03	6.261+01	1.931+01	2.353+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.321+03	4.284+01	1.989+01	1.259+03	
60.	8.006+02	3.108+01	2.012+01	7.494+02	
80.	3.660+02	1.845+01	2.000+01	3.276+02	
100.	2.033+02	1.219+01	1.971+01	1.714+02	
150.	7.663+01	5.651+00	1.852+01	5.246+01	
200.	4.318+01	3.246+00	1.729+01	2.265+01	
300.	2.382+01	1.473+00	1.528+01	7.070+00	
400.	1.782+01	8.369-01	1.378+01	3.198+00	
500.	1.495+01	5.389-01	1.263+01	1.787+00	
600.	1.322+01	3.758-01	1.170+01	1.141+00	
800.	1.110+01	2.125-01	1.030+01	5.892-01	
1000.	9.772+00	1.364-01	9.269+00	3.670-01	
1500.	7.877+00	6.086-02	7.540+00	1.690-01	1.069-01
2000.	6.969+00	3.431-02	6.436+00	1.034-01	3.957-01
3000.	6.151+00	1.528-02	5.062+00	5.558-02	1.018+00
4000.	5.878+00	8.603-03	4.221+00	3.724-02	1.611+00
5000.	5.827+00	5.509-03	3.645+00	2.780-02	2.149+00
6000.	5.875+00	3.827-03	3.221+00	2.211-02	2.628+00
8000.	6.074+00	2.154-03	2.635+00	1.563-02	3.422+00
10000.	6.291+00	1.379-03	2.243+00	1.207-02	4.034+00
15000.	6.753+00	6.131-04	1.659+00	7.667-03	5.086+00
20000.	7.187+00	3.449-04	1.331+00	5.613-03	5.850+00
30000.	8.041+00	1.533-04	9.676-01	3.652-03	7.069+00
40000.	8.705+00	8.626-05	7.682-01	2.706-03	7.934+00
50000.	9.187+00	5.521-05	6.408-01	2.149-03	8.544+00
60000.	9.557+00	3.834-05	5.517-01	1.782-03	9.003+00
80000.	1.012+01	2.157-05	4.347-01	1.329-03	9.688+00
100000.	1.059+01	1.380-05	3.606-01	1.059-03	1.023+01

Z= 45 RHODIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.936+07	1.347+03	1.635-04	1.936+07
.015	1.350+07	1.347+03	3.672-04	1.350+07
.020	1.294+07	1.347+03	6.517-04	1.293+07
.030	9.559+06	1.347+03	1.461-03	9.558+06
.040	6.890+06	1.347+03	2.588-03	6.889+06
.050	5.149+06	1.347+03	4.030-03	5.148+06
.060	3.997+06	1.347+03	5.782-03	3.996+06
.080	2.636+06	1.346+03	1.021-02	2.634+06
.100	1.895+06	1.346+03	1.583-02	1.894+06
.150	1.041+06	1.345+03	3.497-02	1.040+06
.200	6.865+05	1.344+03	6.102-02	6.852+05
.300	3.898+05	1.340+03	1.321-01	3.885+05
.400	3.261+06	1.335+03	2.257-01	3.259+06
.500	3.175+06	1.328+03	3.383-01	3.174+06
.600	2.631+06	1.320+03	4.664-01	2.629+06
.800	1.640+06	1.302+03	7.558-01	1.639+06
1.000	1.035+06	1.279+03	1.066+00	1.034+06
1.500	4.147+05	1.213+03	1.829+00	4.135+05
2.000	2.079+05	1.138+03	2.559+00	2.068+05
3.000	7.382+04	9.856+02	3.945+00	7.283+04
4.000	1.990+05	8.516+02	5.259+00	1.982+05
5.000	1.123+05	7.381+02	6.501+00	1.115+05
6.000	6.950+04	6.455+02	7.662+00	6.884+04
8.000	3.222+04	5.100+02	9.708+00	3.170+04
10.000	1.766+04	4.166+02	1.135+01	1.724+04
15.000	5.929+03	2.710+02	1.419+01	5.644+03
20.000	2.743+03	1.865+02	1.610+01	2.540+03
30.000	5.698+03	1.050+02	1.842+01	5.575+03
40.000	2.636+03	6.617+01	1.965+01	2.550+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.435+03	4.527+01	2.026+01	1.370+03	
60.	8.719+02	3.284+01	2.050+01	8.185+02	
80.	3.997+02	1.950+01	2.039+01	3.598+02	
100.	2.219+02	1.288+01	2.012+01	1.889+02	
150.	8.258+01	5.971+00	1.890+01	5.771+01	
200.	4.554+01	3.429+00	1.765+01	2.446+01	
300.	2.491+01	1.556+00	1.560+01	7.752+00	
400.	1.852+01	8.841-01	1.408+01	3.555+00	
500.	1.548+01	5.693-01	1.290+01	2.005+00	
600.	1.364+01	3.970-01	1.196+01	1.283+00	
800.	1.142+01	2.244-01	1.053+01	6.625-01	
1000.	1.003+01	1.441-01	9.477+00	4.116-01	
1500.	8.075+00	6.430-02	7.711+00	1.882-01	1.113-01
2000.	7.161+00	3.624-02	6.582+00	1.147-01	4.280-01
3000.	6.318+00	1.614-02	5.177+00	6.132-02	1.064+00
4000.	6.022+00	9.088-03	4.317+00	4.100-02	1.655+00
5000.	5.957+00	5.820-03	3.728+00	3.058-02	2.193+00
6000.	6.004+00	4.043-03	3.294+00	2.431-02	2.681+00
8000.	6.235+00	2.275-03	2.694+00	1.719-02	3.521+00
10000.	6.511+00	1.457-03	2.294+00	1.327-02	4.202+00
15000.	7.113+00	6.477-04	1.697+00	8.431-03	5.407+00
20000.	7.577+00	3.644-04	1.361+00	6.174-03	6.210+00
30000.	8.378+00	1.620-04	9.896-01	4.019-03	7.384+00
40000.	9.054+00	9.113-05	7.857-01	2.978-03	8.265+00
50000.	9.593+00	5.833-05	6.553-01	2.365-03	8.935+00
60000.	1.002+01	4.051-05	5.643-01	1.962-03	9.454+00
80000.	1.064+01	2.279-05	4.446-01	1.463-03	1.020+01
100000.	1.107+01	1.458-05	3.688-01	1.166-03	1.070+01

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 46 PALLADIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.914+07	1.408+03	1.470-04	1.914+07	
.015	2.215+07	1.408+03	3.303-04	2.215+07	
.020	1.799+07	1.408+03	5.862-04	1.799+07	
.030	1.113+07	1.408+03	1.314-03	1.113+07	
.040	7.380+06	1.407+03	2.329-03	7.378+06	
.050	5.246+06	1.407+03	3.626-03	5.244+06	
.060	3.934+06	1.407+03	5.203-03	3.933+06	
.080	2.477+06	1.407+03	9.186-03	2.475+06	
.100	1.725+06	1.407+03	1.425-02	1.724+06	
.150	9.001+05	1.406+03	3.150-02	8.987+05	
.200	5.739+05	1.405+03	5.500-02	5.725+05	
.300	3.118+05	1.402+03	1.192-01	3.104+05	
.400	2.333+06	1.397+03	2.039-01	2.332+06	
.500	2.709+06	1.392+03	3.061-01	2.707+06	
.600	2.513+06	1.385+03	4.228-01	2.512+06	
.800	1.717+06	1.369+03	6.875-01	1.715+06	
1.000	1.113+06	1.349+03	9.744-01	1.111+06	
1.500	4.618+05	1.285+03	1.694+00	4.605+05	
2.000	2.350+05	1.208+03	2.402+00	2.338+05	
3.000	8.321+04	1.049+03	3.784+00	8.215+04	
4.000	2.129+05	9.051+02	5.119+00	2.120+05	
5.000	1.224+05	7.820+02	6.394+00	1.217+05	
6.000	7.635+04	6.818+02	7.597+00	7.567+04	
8.000	3.544+04	5.369+02	9.729+00	3.490+04	
10.000	1.935+04	4.383+02	1.145+01	1.890+04	
15.000	6.432+03	2.866+02	1.439+01	6.131+03	
20.000	2.979+03	1.974+02	1.636+01	2.765+03	
30.000	6.126+03	1.110+02	1.873+01	5.996+03	
40.000	2.852+03	6.994+01	1.999+01	2.762+03	
50.	1.557+03	4.785+01	2.063+01	1.489+03	
60.	9.470+02	3.472+01	2.090+01	8.914+02	
80.	4.341+02	2.061+01	2.080+01	3.927+02	
100.	2.406+02	1.362+01	2.053+01	2.064+02	
150.	8.916+01	6.314+00	1.931+01	6.353+01	
200.	4.922+01	3.626+00	1.803+01	2.756+01	
300.	2.626+01	1.645+00	1.595+01	8.668+00	
400.	1.927+01	9.351-01	1.439+01	3.943+00	
500.	1.600+01	6.022-01	1.319+01	2.212+00	
600.	1.406+01	4.199-01	1.223+01	1.415+00	
800.	1.173+01	2.374-01	1.076+01	7.309-01	
1000.	1.030+01	1.524-01	9.688+00	4.547-01	
1500.	8.280+00	6.801-02	7.882+00	2.084-01	1.212-01
2000.	7.306+00	3.833-02	6.728+00	1.271-01	4.130-01
3000.	6.489+00	1.707-02	5.292+00	6.796-02	1.112+00
4000.	6.268+00	9.613-03	4.413+00	4.542-02	1.800+00
5000.	6.268+00	6.156-03	3.810+00	3.385-02	2.418+00
6000.	6.351+00	4.277-03	3.368+00	2.690-02	2.952+00
8000.	6.562+00	2.407-03	2.754+00	1.899-02	3.786+00
10000.	6.737+00	1.541-03	2.345+00	1.465-02	4.376+00
15000.	7.096+00	6.851-04	1.734+00	9.299-03	5.351+00
20000.	7.602+00	3.855-04	1.391+00	6.804-03	6.204+00
30000.	8.759+00	1.713-04	1.012+00	4.426-03	7.743+00
40000.	9.554+00	9.639-05	8.031-01	3.278-03	8.748+00
50000.	1.005+01	6.170-05	6.699-01	2.603-03	9.375+00
60000.	1.040+01	4.285-05	5.768-01	2.159-03	9.819+00
80000.	1.099+01	2.410-05	4.544-01	1.609-03	1.053+01
100000.	1.162+01	1.543-05	3.770-01	1.282-03	1.124+01

Z= 47 SILVER

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.909+14	1.469+03	1.581-04	4.909+14	
.015	9.711+13	1.469+03	3.552-04	9.711+13	
.020	3.077+13	1.469+03	6.304-04	3.077+13	
.030	6.095+12	1.469+03	1.413-03	6.095+12	
.040	1.934+12	1.469+03	2.504-03	1.934+12	
.050	7.944+11	1.469+03	3.898-03	7.944+11	
.060	3.842+11	1.469+03	5.594-03	3.842+11	
.080	1.222+11	1.469+03	9.873-03	1.222+11	
.100	5.034+10	1.469+03	1.532-02	5.034+10	
.150	1.008+10	1.468+03	3.384-02	1.008+10	
.200	3.229+09	1.466+03	5.905-02	3.229+09	
.300	6.523+08	1.462+03	1.279-01	6.523+08	
.400	2.936+08	1.457+03	2.185-01	2.936+08	
.500	1.214+08	1.451+03	3.276-01	1.214+08	
.600	5.862+07	1.443+03	4.519-01	5.862+07	
.800	1.808+07	1.425+03	7.328-01	1.808+07	
1.000	-2.416+06	1.402+03	1.035+00	-2.417+06	
1.500	-1.765+06	1.335+03	1.780+00	-1.766+06	
2.000	-1.358+06	1.257+03	2.500+00	-1.359+06	
3.000	-9.201+05	1.094+03	3.882+00	-9.212+05	
4.000	3.805+05	9.471+02	5.214+00	3.796+05	
5.000	2.324+05	8.198+02	6.491+00	2.316+05	
6.000	1.549+05	7.153+02	7.699+00	1.542+05	
8.000	8.243+04	5.628+02	9.851+00	8.186+04	
10.000	5.132+04	4.584+02	1.160+01	5.085+04	
15.000	2.283+04	2.997+02	1.463+01	2.252+04	
20.000	1.346+04	2.083+02	1.665+01	1.324+04	
30.000	6.581+03	1.170+02	1.907+01	6.444+03	
40.000	3.070+03	7.365+01	2.036+01	2.976+03	
50.	1.679+03	5.036+01	2.101+01	1.607+03	
60.	1.022+03	3.652+01	2.129+01	9.646+02	
80.	4.694+02	2.167+01	2.121+01	4.265+02	
100.	2.602+02	1.431+01	2.095+01	2.249+02	
150.	9.590+01	6.632+00	1.972+01	6.956+01	
200.	5.246+01	3.808+00	1.842+01	3.023+01	
300.	2.754+01	1.728+00	1.629+01	9.516+00	
400.	2.002+01	9.817-01	1.471+01	4.330+00	
500.	1.654+01	6.321-01	1.348+01	2.431+00	
600.	1.449+01	4.408-01	1.249+01	1.556+00	
800.	1.205+01	2.492-01	1.100+01	8.042-01	
1000.	1.056+01	1.600-01	9.899+00	5.003-01	
1500.	8.480+00	7.138-02	8.054+00	2.291-01	1.261-01
2000.	7.505+00	4.023-02	6.874+00	1.397-01	4.506-01
3000.	6.666+00	1.792-02	5.407+00	7.465-02	1.166+00
4000.	6.421+00	1.009-02	4.509+00	4.987-02	1.852+00
5000.	6.409+00	6.461-03	3.893+00	3.716-02	2.472+00
6000.	6.493+00	4.488-03	3.441+00	2.952-02	3.018+00
8000.	6.742+00	2.526-03	2.814+00	2.084-02	3.905+00
10000.	6.984+00	1.617-03	2.396+00	1.607-02	4.571+00
15000.	7.484+00	7.190-04	1.772+00	1.020-02	5.701+00
20000.	8.007+00	4.045-04	1.421+00	7.462-03	6.578+00
30000.	9.101+00	1.798-04	1.034+00	4.853-03	8.062+00
40000.	9.924+00	1.012-04	8.206-01	3.595-03	9.100+00
50000.	1.049+01	6.475-05	6.845-01	2.855-03	9.804+00
60000.	1.091+01	4.497-05	5.893-01	2.367-03	1.032+01
80000.	1.154+01	2.529-05	4.643-01	1.764-03	1.107+01
100000.	1.207+01	1.619-05	3.852-01	1.406-03	1.169+01

Z= 48 CADMIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.153+07	1.533+03	1.809-04	1.153+07	
.015	8.548+06	1.533+03	4.063-04	8.547+06	
.020	1.387+07	1.533+03	7.210-04	1.387+07	
.030	1.290+07	1.533+03	1.616-03	1.290+07	
.040	9.890+06	1.532+03	2.863-03	9.888+06	
.050	7.570+06	1.532+03	4.456-03	7.569+06	
.060	5.937+06	1.532+03	6.393-03	5.936+06	
.080	3.934+06	1.532+03	1.128-02	3.933+06	
.100	2.819+06	1.532+03	1.749-02	2.818+06	
.150	1.522+06	1.531+03	3.862-02	1.520+06	
.200	9.851+05	1.529+03	6.733-02	9.836+05	
.300	5.424+05	1.525+03	1.455-01	5.408+05	
.400	3.611+05	1.519+03	2.481-01	3.595+05	
.500	3.183+06	1.512+03	3.712-01	3.181+06	
.600	2.846+06	1.504+03	5.108-01	2.845+06	
.800	1.952+06	1.484+03	8.236-01	1.950+06	
1.000	1.336+06	1.460+03	1.155+00	1.334+06	
1.500	5.966+05	1.389+03	1.945+00	5.952+05	
2.000	3.106+05	1.307+03	2.675+00	3.093+05	
3.000	1.053+05	1.140+03	4.027+00	1.041+05	
4.000	2.155+05	9.879+02	5.334+00	2.145+05	
5.000	1.431+05	8.570+02	6.603+00	1.422+05	
6.000	8.912+04	7.489+02	7.816+00	8.837+04	
8.000	4.155+04	5.892+02	9.997+00	4.095+04	
10.000	2.282+04	4.794+02	1.177+01	2.233+04	
15.000	7.659+03	3.145+02	1.485+01	7.330+03	
20.000	3.543+03	2.193+02	1.692+01	3.307+03	
30.000	7.082+03	1.231+02	1.938+01	6.939+03	
40.000	3.312+03	7.749+01	2.071+01	3.214+03	
50.	1.816+03	5.299+01	2.139+01	1.741+03	
60.	1.108+03	3.843+01	2.168+01	1.047+03	
80.	5.093+02	2.281+01	2.161+01	4.649+02	
100.	2.819+02	1.507+01	2.136+01	2.455+02	
150.	1.031+02	6.981+00	2.011+01	7.597+01	
200.	5.584+01	4.009+00	1.879+01	3.304+01	
300.	2.887+01	1.819+00	1.663+01	1.042+01	
400.	2.080+01	1.034+00	1.501+01	4.752+00	
500.	1.710+01	6.655-01	1.376+01	2.675+00	
600.	1.494+01	4.640-01	1.276+01	1.717+00	
800.	1.238+01	2.623-01	1.123+01	8.887-01	
1000.	1.083+01	1.684-01	1.011+01	5.530-01	
1500.	8.685+00	7.515-02	8.225+00	2.530-01	1.320-01
2000.	7.705+00	4.236-02	7.020+00	1.540-01	4.886-01
3000.	6.844+00	1.886-02	5.522+00	8.215-02	1.221+00
4000.	6.573+00	1.062-02	4.605+00	5.481-02	1.903+00
5000.	6.542+00	6.802-03	3.976+00	4.081-02	2.518+00
6000.	6.620+00	4.726-03	3.514+00	3.240-02	3.068+00
8000.	6.895+00	2.660-03	2.874+00	2.286-02	3.995+00
10000.	7.199+00	1.703-03	2.447+00	1.762-02	4.733+00
15000.	7.867+00	7.570-04	1.810+00	1.118-02	6.045+00
20000.	8.437+00	4.259-04	1.452+00	8.175-03	6.977+00
30000.	9.425+00	1.893-04	1.056+00	5.315-03	8.364+00
40000.	1.018+01	1.065-04	8.381-01	3.936-03	9.334+00
50000.	1.074+01	6.817-05	6.990-01	3.125-03	1.003+01
60000.	1.117+01	4.734-05	6.019-01	2.591-03	1.057+01
80000.	1.183+01	2.663-05	4.742-01	1.931-03	1.136+01
100000.	1.235+01	1.704-05	3.934-01	1.539-03	1.196+01

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 49 INDIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	3.528+06	1.597+03	1.932-04	3.527+06
.015	1.047+06	1.597+03	4.339-04	1.045+06
.020	7.667+06	1.597+03	7.699-04	7.666+06
.030	7.503+06	1.597+03	1.726-03	7.501+06
.040	6.060+06	1.597+03	3.057-03	6.058+06
.050	4.968+06	1.597+03	4.758-03	4.966+06
.060	4.182+06	1.597+03	6.826-03	4.180+06
.080	3.159+06	1.596+03	1.204-02	3.157+06
.100	2.532+06	1.596+03	1.867-02	2.530+06
.150	1.689+06	1.595+03	4.121-02	1.687+06
.200	1.266+06	1.593+03	7.183-02	1.265+06
.300	8.439+05	1.588+03	1.552-01	8.424+05
.400	6.330+05	1.581+03	2.645-01	6.314+05
.500	3.581+06	1.573+03	3.954-01	3.580+06
.600	3.376+06	1.564+03	5.436-01	3.374+06
.800	2.234+06	1.541+03	8.753-01	2.233+06
1.000	1.456+06	1.514+03	1.225+00	1.454+06
1.500	6.026+05	1.438+03	2.051+00	6.012+05
2.000	3.084+05	1.353+03	2.802+00	3.070+05
3.000	1.144+05	1.181+03	4.174+00	1.133+05
4.000	2.344+05	1.027+03	5.489+00	2.334+05
5.000	1.538+05	8.933+02	6.761+00	1.529+05
6.000	9.619+04	7.823+02	7.976+00	9.540+04
8.000	4.500+04	6.161+02	1.016+01	4.437+04
10.000	2.475+04	5.007+02	1.195+01	2.424+04
15.000	8.313+03	3.298+02	1.508+01	7.968+03
20.000	3.845+03	2.304+02	1.719+01	3.598+03
30.000	7.577+03	1.293+02	1.971+01	7.428+03
40.000	3.565+03	8.140+01	2.106+01	3.462+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.956+03	5.566+01	2.176+01	1.879+03	
60.	1.193+03	4.037+01	2.207+01	1.130+03	
80.	5.472+02	2.395+01	2.199+01	5.012+02	
100.	3.025+02	1.582+01	2.175+01	2.650+02	
150.	1.102+02	7.333+00	2.049+01	8.240+01	
200.	5.933+01	4.211+00	1.915+01	3.597+01	
300.	3.027+01	1.910+00	1.695+01	1.140+01	
400.	2.161+01	1.086+00	1.531+01	5.214+00	
500.	1.767+01	6.990-01	1.404+01	2.936+00	
600.	1.538+01	4.874-01	1.301+01	1.882+00	
800.	1.271+01	2.756-01	1.146+01	9.739-01	
1000.	1.110+01	1.769-01	1.032+01	6.060-01	
1500.	8.891+00	7.894-02	8.395+00	2.773-01	1.395-01
2000.	7.877+00	4.449-02	7.166+00	1.688-01	4.972-01
3000.	7.020+00	1.981-02	5.637+00	9.000-02	1.274+00
4000.	6.782+00	1.116-02	4.701+00	6.003-02	2.010+00
5000.	6.781+00	7.145-03	4.059+00	4.468-02	2.671+00
6000.	6.878+00	4.964-03	3.587+00	3.546-02	3.251+00
8000.	7.156+00	2.793-03	2.934+00	2.500-02	4.194+00
10000.	7.430+00	1.788-03	2.498+00	1.927-02	4.911+00
15000.	8.026+00	7.951-04	1.847+00	1.222-02	6.166+00
20000.	8.642+00	4.474-04	1.482+00	8.934-03	7.151+00
30000.	9.825+00	1.989-04	1.078+00	5.807-03	8.741+00
40000.	1.066+01	1.119-04	8.555-01	4.300-03	9.802+00
50000.	1.123+01	7.160-05	7.136-01	3.414-03	1.051+01
60000.	1.166+01	4.973-05	6.144-01	2.831-03	1.104+01
80000.	1.234+01	2.797-05	4.841-01	2.110-03	1.185+01
100000.	1.296+01	1.790-05	4.016-01	1.681-03	1.256+01

Z= 50 TIN

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.439+07	1.663+03	1.950-04	1.439+07
.015	4.264+06	1.663+03	4.380-04	4.262+06
.020	1.800+06	1.663+03	7.772-04	1.798+06
.030	1.348+07	1.663+03	1.742-03	1.348+07
.040	1.202+07	1.663+03	3.086-03	1.201+07
.050	9.192+06	1.663+03	4.804-03	9.190+06
.060	7.180+06	1.663+03	6.892-03	7.179+06
.080	4.867+06	1.662+03	1.216-02	4.865+06
.100	3.663+06	1.662+03	1.886-02	3.661+06
.150	2.287+06	1.660+03	4.163-02	2.286+06
.200	1.683+06	1.659+03	7.258-02	1.681+06
.300	1.115+06	1.653+03	1.569-01	1.113+06
.400	8.386+05	1.646+03	2.675-01	8.369+05
.500	4.767+06	1.637+03	4.001-01	4.766+06
.600	3.289+06	1.627+03	5.505-01	3.287+06
.800	2.387+06	1.603+03	8.877-01	2.386+06
1.000	1.542+06	1.575+03	1.245+00	1.540+06
1.500	6.438+05	1.493+03	2.095+00	6.423+05
2.000	3.325+05	1.403+03	2.878+00	3.311+05
3.000	1.234+05	1.224+03	4.314+00	1.221+05
4.000	1.843+05	1.065+03	5.669+00	1.833+05
5.000	1.643+05	9.296+02	6.959+00	1.633+05
6.000	1.043+05	8.159+02	8.175+00	1.035+05
8.000	4.925+04	6.436+02	1.035+01	4.860+04
10.000	2.707+04	5.229+02	1.213+01	2.654+04
15.000	9.013+03	3.457+02	1.533+01	8.652+03
20.000	4.147+03	2.417+02	1.749+01	3.888+03
30.000	8.061+03	1.357+02	2.005+01	7.905+03
40.000	3.808+03	8.547+01	2.142+01	3.701+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.097+03	5.845+01	2.213+01	2.016+03	
60.	1.282+03	4.239+01	2.245+01	1.217+03	
80.	5.907+02	2.516+01	2.239+01	5.431+02	
100.	3.271+02	1.662+01	2.215+01	2.883+02	
150.	1.186+02	7.703+00	2.089+01	8.998+01	
200.	6.328+01	4.424+00	1.952+01	3.933+01	
300.	3.178+01	2.007+00	1.729+01	1.248+01	
400.	2.246+01	1.140+00	1.562+01	5.705+00	
500.	1.827+01	7.344-01	1.432+01	3.213+00	
600.	1.585+01	5.121-01	1.328+01	2.061+00	
800.	1.305+01	2.895-01	1.169+01	1.068+00	
1000.	1.138+01	1.859-01	1.053+01	6.649-01	
1500.	9.101+00	8.294-02	8.566+00	3.045-01	1.475-01
2000.	8.056+00	4.675-02	7.312+00	1.853-01	5.117-01
3000.	7.199+00	2.082-02	5.752+00	9.874-02	1.327+00
4000.	6.986+00	1.172-02	4.797+00	6.580-02	2.112+00
5000.	7.016+00	7.507-03	4.142+00	4.894-02	2.818+00
6000.	7.140+00	5.215-03	3.660+00	3.882-02	3.436+00
8000.	7.454+00	2.935-03	2.994+00	2.735-02	4.430+00
10000.	7.742+00	1.879-03	2.549+00	2.107-02	5.170+00
15000.	8.326+00	8.354-04	1.885+00	1.334-02	6.427+00
20000.	8.939+00	4.700-04	1.512+00	9.753-03	7.417+00
30000.	1.017+01	2.089-04	1.100+00	6.336-03	9.060+00
40000.	1.104+01	1.175-04	8.730-01	4.691-03	1.016+01
50000.	1.162+01	7.523-05	7.281-01	3.723-03	1.089+01
60000.	1.206+01	5.225-05	6.269-01	3.087-03	1.143+01
80000.	1.279+01	2.939-05	4.940-01	2.300-03	1.229+01
100000.	1.349+01	1.881-05	4.098-01	1.833-03	1.308+01

Z= 51 ANTIMONY

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	3.327+07	1.730+03	1.909-04	3.327+07
.015	8.632+06	1.730+03	4.289-04	8.630+06
.020	2.944+06	1.730+03	7.610-04	2.942+06
.030	9.012+05	1.730+03	1.706-03	8.994+05
.040	1.404+07	1.730+03	3.022-03	1.403+07
.050	1.120+07	1.730+03	4.705-03	1.120+07
.060	8.002+06	1.730+03	6.750-03	8.001+06
.080	4.448+06	1.729+03	1.191-02	4.446+06
.100	2.958+06	1.729+03	1.847-02	2.956+06
.150	1.766+06	1.728+03	4.079-02	1.764+06
.200	1.404+06	1.726+03	7.115-02	1.403+06
.300	1.080+06	1.720+03	1.539-01	1.078+06
.400	8.930+05	1.713+03	2.626-01	8.913+05
.500	7.625+05	1.704+03	3.931-01	7.608+05
.600	4.160+06	1.693+03	5.414-01	4.158+06
.800	2.937+06	1.668+03	8.748-01	2.936+06
1.000	1.817+06	1.638+03	1.230+00	1.816+06
1.500	7.264+05	1.552+03	2.087+00	7.248+05
2.000	3.696+05	1.457+03	2.889+00	3.682+05
3.000	1.368+05	1.268+03	4.377+00	1.356+05
4.000	6.429+04	1.105+03	5.775+00	6.317+04
5.000	1.782+05	9.659+02	7.095+00	1.772+05
6.000	1.120+05	8.492+02	8.330+00	1.112+05
8.000	5.268+04	6.703+02	1.052+01	5.200+04
10.000	2.904+04	5.432+02	1.233+01	2.849+04
15.000	9.766+03	3.530+02	1.557+01	9.397+03
20.000	4.520+03	2.531+02	1.776+01	4.250+03
30.000	1.538+03	1.423+02	2.036+01	1.376+03
40.000	4.077+03	8.972+01	2.176+01	3.965+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.247+03	6.138+01	2.250+01	2.163+03	
60.	1.376+03	4.454+01	2.284+01	1.309+03	
80.	6.350+02	2.644+01	2.281+01	5.858+02	
100.	3.516+02	1.747+01	2.258+01	3.116+02	
150.	1.270+02	8.100+00	2.130+01	9.756+01	
200.	6.731+01	4.653+00	1.992+01	4.274+01	
300.	3.335+01	2.111+00	1.764+01	1.360+01	
400.	2.336+01	1.200+00	1.593+01	6.225+00	
500.	1.889+01	7.726-01	1.461+01	3.506+00	
600.	1.633+01	5.387-01	1.355+01	2.248+00	
800.	1.340+01	3.046-01	1.193+01	1.164+00	
1000.	1.166+01	1.955-01	1.074+01	7.241-01	
1500.	9.313+00	8.726-02	8.738+00	3.313-01	1.564-01
2000.	8.241+00	4.919-02	7.459+00	2.016-01	5.313-01
3000.	7.380+00	2.190-02	5.867+00	1.074-01	1.383+00
4000.	7.180+00	1.233-02	4.893+00	7.156-02	2.204+00
5000.	7.223+00	7.899-03	4.225+00	5.323-02	2.937+00
6000.	7.354+00	5.487-03	3.734+00	4.222-02	3.573+00
8000.	7.666+00	3.088-03	3.054+00	2.975-02	4.579+00
10000.	7.937+00	1.977-03	2.600+00	2.291-02	5.312+00
15000.	8.500+00	8.791-04	1.923+00	1.452-02	6.561+00
20000.	9.169+00	4.946-04	1.542+00	1.061-02	7.616+00
30000.	1.056+01	2.199-04	1.122+00	6.894-03	9.426+00
40000.	1.150+01	1.237-04	8.904-01	5.104-03	1.060+01
50000.	1.210+01	7.916-05	7.427-01	4.052-03	1.135+01
60000.	1.253+01	5.497-05	6.395-01	3.359-03	1.189+01
80000.	1.324+01	3.092-05	5.038-01	2.503-03	1.273+01
100000.	1.396+01	1.979-05	4.180-01	1.994-03	1.354+01

Z= 52 TELLURIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	4.874+07	1.799+03	1.893-04	4.873+07
.015	1.444+07	1.799+03	4.252-04	1.444+07
.020	6.093+06	1.799+03	7.546-04	6.092+06
.030	1.807+06	1.799+03	1.692-03	1.805+06
.040	7.633+05	1.799+03	2.997-03	7.615+05
.050	1.027+07	1.798+03	4.666-03	1.026+07
.060	9.147+06	1.798+03	6.695-03	9.145+06
.080	5.574+06	1.798+03	1.182-02	5.572+06
.100	3.549+06	1.798+03	1.833-02	3.547+06
.150	1.711+06	1.796+03	4.048-02	1.710+06
.200	1.180+06	1.794+03	7.063-02	1.179+06
.300	8.180+05	1.789+03	1.529-01	8.162+05
.400	6.598+05	1.781+03	2.611-01	6.580+05
.500	5.602+05	1.772+03	3.912-01	5.584+05
.600	5.100+06	1.761+03	5.393-01	5.099+06
.800	2.616+06	1.735+03	8.733-01	2.614+06
1.000	1.771+06	1.704+03	1.231+00	1.769+06
1.500	7.980+05	1.614+03	2.106+00	7.964+05
2.000	4.025+05	1.512+03	2.937+00	4.010+05
3.000	1.464+05	1.313+03	4.494+00	1.451+05
4.000	7.063+04	1.144+03	5.941+00	6.948+04
5.000	1.888+05	1.002+03	7.286+00	1.878+05
6.000	1.203+05	8.830+02	8.531+00	1.194+05
8.000	5.715+04	6.987+02	1.072+01	5.644+04
10.000	3.154+04	5.671+02	1.253+01	3.096+04
15.000	1.055+04	3.717+02	1.581+01	1.016+04
20.000	4.856+03	2.644+02	1.804+01	4.573+03
30.000	1.658+03	1.490+02	2.070+01	1.488+03
40.000	4.362+03	9.406+01	2.214+01	4.245+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.408+03	6.440+01	2.289+01	2.320+03	
60.	1.474+03	4.675+01	2.323+01	1.404+03	
80.	6.790+02	2.777+01	2.319+01	6.280+02	
100.	3.756+02	1.836+01	2.297+01	3.343+02	
150.	1.353+02	8.515+00	2.168+01	1.051+02	
200.	7.139+01	4.892+00	2.028+01	4.622+01	
300.	3.499+01	2.220+00	1.797+01	1.479+01	
400.	2.430+01	1.262+00	1.623+01	6.800+00	
500.	1.954+01	8.127-01	1.489+01	3.836+00	
600.	1.683+01	5.667-01	1.381+01	2.462+00	
800.	1.375+01	3.204-01	1.216+01	1.274+00	
1000.	1.194+01	2.057-01	1.095+01	7.926-01	
1500.	9.525+00	9.180-02	8.909+00	3.621-01	1.621-01
2000.	8.446+00	5.175-02	7.605+00	2.201-01	5.699-01
3000.	7.563+00	2.305-02	5.982+00	1.171-01	1.441+00
4000.	7.338+00	1.298-02	4.988+00	7.797-02	2.259+00
5000.	7.363+00	8.310-03	4.307+00	5.796-02	2.989+00
6000.	7.488+00	5.773-03	3.807+00	4.596-02	3.630+00
8000.	7.821+00	3.249-03	3.114+00	3.237-02	4.672+00
10000.	8.145+00	2.080-03	2.651+00	2.493-02	5.467+00
15000.	8.851+00	9.249-04	1.960+00	1.579-02	6.874+00
20000.	9.563+00	5.203-04	1.573+00	1.154-02	7.978+00
30000.	1.089+01	2.313-04	1.144+00	7.494-03	9.735+00
40000.	1.181+01	1.301-04	9.079-01	5.548-03	1.090+01
50000.	1.245+01	8.329-05	7.573-01	4.404-03	1.169+01
60000.	1.293+01	5.784-05	6.520-01	3.651-03	1.227+01
80000.	1.371+01	3.254-05	5.137-01	2.720-03	1.319+01
100000.	1.442+01	2.082-05	4.262-01	2.168-03	1.399+01

Z= 53 IODINE

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.383+08	1.869+03	1.833-04	1.383+08
.015	2.722+07	1.869+03	4.117-04	2.721+07
.020	8.793+06	1.868+03	7.307-04	8.791+06
.030	2.296+06	1.868+03	1.638-03	2.294+06
.040	1.299+06	1.868+03	2.903-03	1.297+06
.050	2.764+06	1.868+03	4.520-03	2.762+06
.060	4.293+06	1.868+03	6.485-03	4.292+06
.080	4.161+06	1.868+03	1.145-02	4.159+06
.100	3.475+06	1.867+03	1.776-02	3.473+06
.150	2.279+06	1.866+03	3.925-02	2.277+06
.200	1.658+06	1.864+03	6.852-02	1.656+06
.300	1.061+06	1.858+03	1.485-01	1.059+06
.400	7.781+05	1.851+03	2.539-01	7.762+05
.500	6.138+05	1.842+03	3.810-01	6.120+05
.600	5.068+05	1.831+03	5.260-01	5.049+05
.800	2.828+06	1.804+03	8.546-01	2.826+06
1.000	1.931+06	1.773+03	1.210+00	1.929+06
1.500	8.104+05	1.678+03	2.095+00	8.087+05
2.000	4.160+05	1.571+03	2.956+00	4.144+05
3.000	1.571+05	1.362+03	4.591+00	1.558+05
4.000	7.598+04	1.186+03	6.097+00	7.479+04
5.000	1.775+05	1.040+03	7.475+00	1.764+05
6.000	1.294+05	9.173+02	8.735+00	1.284+05
8.000	6.117+04	7.272+02	1.093+01	6.043+04
10.000	3.380+04	5.907+02	1.275+01	3.319+04
15.000	1.139+04	3.865+02	1.607+01	1.098+04
20.000	5.267+03	2.764+02	1.834+01	4.972+03
30.000	1.788+03	1.564+02	2.102+01	1.610+03
40.000	4.654+03	9.894+01	2.248+01	4.532+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.576+03	6.784+01	2.325+01	2.485+03	
60.	1.579+03	4.929+01	2.362+01	1.506+03	
80.	7.277+02	2.931+01	2.359+01	6.748+02	
100.	4.021+02	1.939+01	2.338+01	3.593+02	
150.	1.444+02	9.001+00	2.208+01	1.133+02	
200.	7.585+01	5.173+00	2.066+01	5.002+01	
300.	3.677+01	2.349+00	1.831+01	1.611+01	
400.	2.531+01	1.335+00	1.655+01	7.429+00	
500.	2.022+01	8.601-01	1.517+01	4.190+00	
600.	1.736+01	5.998-01	1.407+01	2.685+00	
800.	1.412+01	3.392-01	1.239+01	1.388+00	
1000.	1.224+01	2.178-01	1.116+01	8.633-01	
1500.	9.741+00	9.719-02	9.080+00	3.944-01	1.693-01
2000.	8.652+00	5.478-02	7.751+00	2.397-01	6.070-01
3000.	7.754+00	2.440-02	6.097+00	1.275-01	1.505+00
4000.	7.519+00	1.374-02	5.084+00	8.484-02	2.336+00
5000.	7.541+00	8.799-03	4.390+00	6.305-02	3.079+00
6000.	7.673+00	6.113-03	3.880+00	4.998-02	3.736+00
8000.	8.041+00	3.440-03	3.173+00	3.518-02	4.829+00
10000.	8.417+00	2.202-03	2.702+00	2.708-02	5.686+00
15000.	9.232+00	9.793-04	1.998+00	1.714-02	7.215+00
20000.	9.961+00	5.510-04	1.603+00	1.252-02	8.346+00
30000.	1.124+01	2.449-04	1.166+00	8.133-03	1.007+01
40000.	1.218+01	1.378-04	9.254-01	6.020-03	1.125+01
50000.	1.287+01	8.819-05	7.718-01	4.778-03	1.209+01
60000.	1.340+01	6.124-05	6.646-01	3.960-03	1.273+01
80000.	1.425+01	3.445-05	5.236-01	2.951-03	1.373+01
100000.	1.497+01	2.205-05	4.344-01	2.351-03	1.454+01

Z= 54 XENON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	3.220+06	1.940+03	1.672-04	3.218+06
.015	1.196+07	1.940+03	3.756-04	1.196+07
.020	7.080+06	1.940+03	6.667-04	7.078+06
.030	2.707+06	1.940+03	1.495-03	2.705+06
.040	1.367+06	1.940+03	2.649-03	1.365+06
.050	8.556+05	1.939+03	4.126-03	8.537+05
.060	6.191+05	1.939+03	5.922-03	6.172+05
.080	6.459+06	1.939+03	1.046-02	6.457+06
.100	4.390+06	1.939+03	1.623-02	4.388+06
.150	1.666+06	1.937+03	3.591-02	1.664+06
.200	1.019+06	1.935+03	6.275-02	1.017+06
.300	8.015+05	1.930+03	1.363-01	7.996+05
.400	7.542+05	1.922+03	2.337-01	7.523+05
.500	7.098+05	1.913+03	3.516-01	7.079+05
.600	6.632+05	1.902+03	4.868-01	6.613+05
.800	2.667+06	1.875+03	7.962-01	2.665+06
1.000	2.134+06	1.843+03	1.136+00	2.132+06
1.500	8.596+05	1.745+03	2.014+00	8.578+05
2.000	4.464+05	1.633+03	2.903+00	4.448+05
3.000	1.698+05	1.412+03	4.638+00	1.684+05
4.000	8.223+04	1.229+03	6.221+00	8.100+04
5.000	1.404+05	1.078+03	7.641+00	1.393+05
6.000	1.383+05	9.516+02	8.918+00	1.373+05
8.000	6.578+04	7.561+02	1.111+01	6.502+04
10.000	3.643+04	6.154+02	1.294+01	3.580+04
15.000	1.228+04	4.032+02	1.633+01	1.186+04
20.000	5.677+03	2.881+02	1.864+01	5.370+03
30.000	1.929+03	1.641+02	2.137+01	1.744+03
40.000	4.965+03	1.041+02	2.285+01	4.838+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.752+03	7.145+01	2.363+01	2.657+03	
60.	1.688+03	5.197+01	2.401+01	1.612+03	
80.	7.791+02	3.094+01	2.398+01	7.242+02	
100.	4.311+02	2.048+01	2.378+01	3.869+02	
150.	1.547+02	9.516+00	2.247+01	1.227+02	
200.	8.087+01	5.472+00	2.103+01	5.437+01	
300.	3.871+01	2.485+00	1.865+01	1.757+01	
400.	2.637+01	1.413+00	1.685+01	8.103+00	
500.	2.093+01	9.104-01	1.545+01	4.560+00	
600.	1.788+01	6.350-01	1.433+01	2.916+00	
800.	1.449+01	3.591-01	1.263+01	1.506+00	
1000.	1.253+01	2.306-01	1.137+01	9.368-01	
1500.	9.959+00	1.029-01	9.251+00	4.287-01	1.770-01
2000.	8.869+00	5.801-02	7.897+00	2.608-01	6.533-01
3000.	7.946+00	2.584-02	6.212+00	1.387-01	1.570+00
4000.	7.681+00	1.455-02	5.180+00	9.231-02	2.394+00
5000.	7.683+00	9.318-03	4.473+00	6.857-02	3.132+00
6000.	7.809+00	6.474-03	3.953+00	5.433-02	3.795+00
8000.	8.208+00	3.643-03	3.233+00	3.822-02	4.933+00
10000.	8.652+00	2.332-03	2.753+00	2.940-02	5.868+00
15000.	9.631+00	1.037-03	2.036+00	1.859-02	7.575+00
20000.	1.039+01	5.835-04	1.633+00	1.358-02	8.738+00
30000.	1.156+01	2.594-04	1.188+00	8.810-03	1.036+01
40000.	1.248+01	1.459-04	9.428-01	6.518-03	1.153+01
50000.	1.323+01	9.340-05	7.864-01	5.172-03	1.244+01
60000.	1.384+01	6.486-05	6.771-01	4.287-03	1.316+01
80000.	1.480+01	3.649-05	5.335-01	3.193-03	1.426+01
100000.	1.552+01	2.335-05	4.426-01	2.544-03	1.508+01

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 55 CESIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	2.157+08	2.012+03	1.952-04	2.156+08	
.015	5.946+07	2.012+03	4.383-04	5.946+07	
.020	2.253+07	2.012+03	7.779-04	2.253+07	
.030	5.393+06	2.012+03	1.744-03	5.391+06	
.040	2.009+06	2.012+03	3.090-03	2.007+06	
.050	1.060+06	2.012+03	4.812-03	1.058+06	
.060	7.339+05	2.012+03	6.905-03	7.319+05	
.080	8.696+07	2.011+03	1.219-02	8.696+07	
.100	2.157+07	2.011+03	1.891-02	2.156+07	
.150	1.499+06	2.008+03	4.179-02	1.497+06	
.200	1.325+06	2.006+03	7.296-02	1.323+06	
.300	1.456+06	1.998+03	1.581-01	1.454+06	
.400	1.115+06	1.988+03	2.704-01	1.113+06	
.500	7.961+05	1.975+03	4.057-01	7.941+05	
.600	5.616+05	1.960+03	5.601-01	5.596+05	
.800	-2.875+06	1.926+03	9.102-01	-2.877+06	
1.000	-3.122+05	1.887+03	1.289+00	-3.141+05	
1.500	-5.294+05	1.781+03	2.232+00	-5.312+05	
2.000	-1.263+05	1.669+03	3.149+00	-1.280+05	
3.000	9.241+03	1.454+03	4.881+00	7.783+03	
4.000	2.433+04	1.270+03	6.453+00	2.305+04	
5.000	2.455+04	1.114+03	7.870+00	2.343+04	
6.000	3.538+05	9.836+02	9.150+00	3.528+05	
8.000	2.638+05	7.830+02	1.136+01	2.630+05	
10.000	2.102+05	6.389+02	1.319+01	2.096+05	
15.000	1.394+05	4.201+02	1.658+01	1.390+05	
20.000	1.043+05	2.998+02	1.891+01	1.040+05	
30.000	6.932+04	1.718+02	2.169+01	6.912+04	
40.000	4.718+04	1.094+02	2.321+01	4.705+04	
50.	3.646+04	7.526+01	2.401+01	3.636+04	
60.	2.974+04	5.481+01	2.439+01	2.967+04	
80.	2.179+04	3.270+01	2.437+01	2.173+04	
100.	1.723+04	2.167+01	2.418+01	1.718+04	
150.	1.651+02	1.008+01	2.286+01	1.322+02	
200.	8.583+01	5.800+00	2.140+01	5.863+01	
300.	4.061+01	2.636+00	1.898+01	1.899+01	
400.	2.743+01	1.500+00	1.715+01	8.777+00	
500.	2.165+01	9.662-01	1.574+01	4.951+00	
600.	1.844+01	6.740-01	1.460+01	3.171+00	
800.	1.488+01	3.812-01	1.286+01	1.640+00	
1000.	1.284+01	2.448-01	1.158+01	1.020+00	
1500.	1.018+01	1.093-01	9.422+00	4.663-01	1.843-01
2000.	9.083+00	6.161-02	8.043+00	2.834-01	6.948-01
3000.	8.146+00	2.744-02	6.327+00	1.505-01	1.641+00
4000.	7.867+00	1.545-02	5.276+00	1.001-01	2.476+00
5000.	7.861+00	9.897-03	4.556+00	7.428-02	3.221+00
6000.	7.987+00	6.876-03	4.026+00	5.884-02	3.895+00
8000.	8.413+00	3.870-03	3.293+00	4.137-02	5.074+00
10000.	8.909+00	2.477-03	2.804+00	3.182-02	6.071+00
15000.	1.003+01	1.102-03	2.074+00	2.011-02	7.936+00
20000.	1.085+01	6.198-04	1.663+00	1.468-02	9.171+00
30000.	1.200+01	2.755-04	1.210+00	9.527-03	1.078+01
40000.	1.290+01	1.550-04	9.603-01	7.049-03	1.194+01
50000.	1.367+01	9.920-05	8.010-01	5.593-03	1.286+01
60000.	1.430+01	6.889-05	6.896-01	4.635-03	1.361+01
80000.	1.530+01	3.875-05	5.433-01	3.453-03	1.475+01
100000.	1.602+01	2.480-05	4.508-01	2.751-03	1.557+01

Z= 56 BARIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	9.217+13	2.086+03	2.245-04	9.217+13	
.015	1.820+13	2.086+03	5.042-04	1.820+13	
.020	5.757+12	2.086+03	8.947-04	5.757+12	
.030	1.136+12	2.086+03	2.006-03	1.136+12	
.040	3.590+11	2.086+03	3.553-03	3.590+11	
.050	1.468+11	2.086+03	5.532-03	1.468+11	
.060	7.068+10	2.085+03	7.937-03	7.068+10	
.080	2.227+10	2.085+03	1.401-02	2.227+10	
.100	1.769+10	2.084+03	2.172-02	1.769+10	
.150	3.431+09	2.082+03	4.798-02	3.431+09	
.200	1.072+09	2.078+03	8.368-02	1.072+09	
.300	2.169+08	2.069+03	1.811-01	2.169+08	
.400	7.811+07	2.056+03	3.090-01	7.810+07	
.500	4.079+07	2.042+03	4.628-01	4.079+07	
.600	2.710+07	2.024+03	6.376-01	2.710+07	
.800	1.149+07	1.985+03	1.031+00	1.149+07	
1.000	1.161+07	1.941+03	1.451+00	1.161+07	
1.500	-2.896+09	1.827+03	2.469+00	-2.896+09	
2.000	-1.565+09	1.712+03	3.423+00	-1.565+09	
3.000	-6.391+08	1.495+03	5.167+00	-6.391+08	
4.000	-3.276+08	1.308+03	6.731+00	-3.276+08	
5.000	-1.893+08	1.149+03	8.141+00	-1.893+08	
6.000	5.783+05	1.015+03	9.412+00	5.773+05	
8.000	3.488+05	8.091+02	1.161+01	3.480+05	
10.000	2.375+05	6.602+02	1.344+01	2.369+05	
15.000	1.209+05	4.318+02	1.685+01	1.205+05	
20.000	7.645+04	3.114+02	1.920+01	7.612+04	
30.000	4.139+04	1.797+02	2.201+01	4.119+04	
40.000	6.918+04	1.149+02	2.354+01	6.904+04	
50.	5.357+04	7.922+01	2.436+01	5.346+04	
60.	4.365+04	5.779+01	2.476+01	4.357+04	
80.	3.181+04	3.453+01	2.476+01	3.175+04	
100.	2.500+04	2.291+01	2.459+01	2.495+04	
150.	4.202+03	1.067+01	2.326+01	4.168+03	
200.	2.776+03	6.145+00	2.177+01	2.748+03	
300.	1.600+03	2.795+00	1.932+01	1.578+03	
400.	1.107+03	1.591+00	1.746+01	1.088+03	
500.	8.410+02	1.025+00	1.602+01	8.239+02	
600.	1.901+01	7.151-01	1.486+01	3.431+00	
800.	1.527+01	4.045-01	1.309+01	1.776+00	
1000.	1.315+01	2.598-01	1.179+01	1.106+00	
1500.	1.041+01	1.160-01	9.593+00	5.055-01	1.937-01
2000.	9.278+00	6.540-02	8.189+00	3.072-01	7.166-01
3000.	8.334+00	2.913-02	6.442+00	1.631-01	1.700+00
4000.	8.073+00	1.640-02	5.372+00	1.084-01	2.576+00
5000.	8.089+00	1.051-02	4.639+00	8.041-02	3.360+00
6000.	8.238+00	7.299-03	4.100+00	6.367-02	4.068+00
8000.	8.700+00	4.108-03	3.353+00	4.475-02	5.298+00
10000.	9.217+00	2.630-03	2.855+00	3.441-02	6.325+00
15000.	1.036+01	1.169-03	2.111+00	2.174-02	8.222+00
20000.	1.120+01	6.580-04	1.694+00	1.587-02	9.486+00
30000.	1.243+01	2.925-04	1.232+00	1.029-02	1.119+01
40000.	1.342+01	1.646-04	9.777-01	7.614-03	1.243+01
50000.	1.423+01	1.053-04	8.155-01	6.041-03	1.341+01
60000.	1.490+01	7.314-05	7.022-01	5.007-03	1.419+01
80000.	1.592+01	4.115-05	5.532-01	3.729-03	1.536+01
100000.	1.664+01	2.633-05	4.590-01	2.971-03	1.618+01

Z= 57 LANTHANUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	5.586+07	2.161+03	2.287-04	5.586+07	
.015	3.552+07	2.161+03	5.137-04	3.551+07	
.020	1.713+07	2.161+03	9.117-04	1.713+07	
.030	5.073+06	2.161+03	2.044-03	5.071+06	
.040	2.115+06	2.161+03	3.621-03	2.112+06	
.050	1.185+06	2.161+03	5.637-03	1.183+06	
.060	8.358+05	2.160+03	8.087-03	8.336+05	
.080	6.104+05	2.160+03	1.427-02	6.082+05	
.100	6.049+06	2.159+03	2.214-02	6.047+06	
.150	2.524+06	2.157+03	4.889-02	2.522+06	
.200	2.134+06	2.153+03	8.529-02	2.132+06	
.300	1.549+06	2.144+03	1.846-01	1.547+06	
.400	1.131+06	2.131+03	3.151-01	1.128+06	
.500	8.566+05	2.116+03	4.719-01	8.545+05	
.600	6.735+05	2.098+03	6.503-01	6.714+05	
.800	4.542+05	2.057+03	1.052+00	4.521+05	
1.000	2.168+06	2.012+03	1.482+00	2.166+06	
1.500	1.040+06	1.892+03	2.525+00	1.038+06	
2.000	5.501+05	1.770+03	3.505+00	5.484+05	
3.000	2.150+05	1.541+03	5.298+00	2.135+05	
4.000	1.059+05	1.348+03	6.901+00	1.045+05	
5.000	5.869+04	1.185+03	8.338+00	5.750+04	
6.000	1.476+05	1.049+03	9.627+00	1.465+05	
8.000	8.112+04	8.371+02	1.184+01	8.027+04	
10.000	4.527+04	6.837+02	1.369+01	4.457+04	
15.000	1.531+04	4.468+02	1.712+01	1.485+04	
20.000	7.070+03	3.234+02	1.950+01	6.727+03	
30.000	2.403+03	1.875+02	2.236+01	2.193+03	
40.000	5.957+03	1.201+02	2.392+01	5.813+03	
50.	3.329+03	8.290+01	2.475+01	3.221+03	
60.	2.053+03	6.051+01	2.515+01	1.968+03	
80.	9.536+02	3.619+01	2.516+01	8.923+02	
100.	5.284+02	2.401+01	2.499+01	4.794+02	
150.	1.880+02	1.119+01	2.365+01	1.531+02	
200.	9.664+01	6.447+00	2.215+01	6.804+01	
300.	4.466+01	2.933+00	1.966+01	2.207+01	
400.	2.966+01	1.669+00	1.777+01	1.021+01	
500.	2.315+01	1.076+00	1.630+01	5.771+00	
600.	1.958+01	7.505-01	1.512+01	3.702+00	
800.	1.567+01	4.246-01	1.332+01	1.918+00	
1000.	1.346+01	2.727-01	1.200+01	1.194+00	
1500.	1.063+01	1.218-01	9.764+00	5.463-01	2.023-01
2000.	9.489+00	6.865-02	8.335+00	3.319-01	7.532-01
3000.	8.536+00	3.058-02	6.557+00	1.761-01	1.772+00
4000.	8.271+00	1.722-02	5.468+00	1.170-01	2.668+00
5000.	8.286+00	1.103-02	4.721+00	8.679-02	3.466+00
6000.	8.435+00	7.663-03	4.173+00	6.871-02	4.186+00
8000.	8.903+00	4.313-03	3.413+00	4.828-02	5.438+00
10000.	9.434+00	2.761-03	2.906+00	3.711-02	6.489+00
15000.	1.062+01	1.228-03	2.149+00	2.344-02	8.445+00
20000.	1.149+01	6.908-04	1.724+00	1.711-02	9.747+00
30000.	1.274+01	3.071-04	1.254+00	1.110-02	1.148+01
40000.	1.374+01	1.728-04	9.952-01	8.208-03	1.273+01
50000.	1.456+01	1.106-04	8.301-01	6.512-03	1.372+01
60000.	1.524+01	7.679-05	7.147-01	5.397-03	1.452+01
80000.	1.626+01	4.320-05	5.631-01	4.019-03	1.569+01
100000.	1.697+01	2.765-05	4.672-01	3.202-03	1.650+01

Z= 58 CERIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.194+05	2.238+03	2.208-04	1.172+05
.015	5.994+07	2.238+03	4.960-04	5.994+07
.020	3.232+07	2.238+03	8.802-04	3.232+07
.030	9.669+06	2.238+03	1.973-03	9.666+06
.040	3.955+06	2.237+03	3.496-03	3.953+06
.050	2.272+06	2.237+03	5.443-03	2.270+06
.060	1.713+06	2.237+03	7.810-03	1.711+06
.080	1.430+06	2.236+03	1.379-02	1.428+06
.100	1.364+06	2.236+03	2.138-02	1.362+06
.150	1.369+06	2.233+03	4.724-02	1.367+06
.200	9.723+05	2.230+03	8.244-02	9.701+05
.300	1.055+06	2.220+03	1.785-01	1.053+06
.400	9.511+05	2.208+03	3.050-01	9.489+05
.500	8.176+05	2.192+03	4.572-01	8.154+05
.600	7.018+05	2.175+03	6.306-01	6.996+05
.800	5.337+05	2.134+03	1.022+00	5.315+05
1.000	2.289+06	2.088+03	1.443+00	2.287+06
1.500	1.183+06	1.967+03	2.479+00	1.181+06
2.000	6.142+05	1.843+03	3.467+00	6.124+05
3.000	2.318+05	1.608+03	5.296+00	2.302+05
4.000	1.133+05	1.407+03	6.927+00	1.119+05
5.000	6.406+04	1.238+03	8.380+00	6.281+04
6.000	1.164+05	1.095+03	9.677+00	1.153+05
8.000	8.697+04	8.740+02	1.190+01	8.608+04
10.000	4.900+04	7.142+02	1.377+01	4.827+04
15.000	1.661+04	4.696+02	1.730+01	1.613+04
20.000	7.636+03	3.367+02	1.975+01	7.280+03
30.000	2.588+03	1.958+02	2.267+01	2.369+03
40.000	1.233+03	1.255+02	2.426+01	1.083+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	3.560+03	8.672+01	2.511+01	3.449+03	
60.	2.203+03	6.332+01	2.553+01	2.114+03	
80.	1.026+03	3.789+01	2.554+01	9.624+02	
100.	5.686+02	2.515+01	2.538+01	5.181+02	
150.	2.016+02	1.173+01	2.403+01	1.659+02	
200.	1.031+02	6.756+00	2.251+01	7.385+01	
300.	4.707+01	3.074+00	1.999+01	2.401+01	
400.	3.094+01	1.750+00	1.807+01	1.112+01	
500.	2.399+01	1.128+00	1.658+01	6.277+00	
600.	2.019+01	7.868-01	1.538+01	4.023+00	
800.	1.608+01	4.452-01	1.355+01	2.082+00	
1000.	1.379+01	2.859-01	1.220+01	1.296+00	
1500.	1.087+01	1.277-01	9.935+00	5.928-01	2.132-01
2000.	9.703+00	7.197-02	8.481+00	3.602-01	7.894-01
3000.	8.743+00	3.206-02	6.672+00	1.913-01	1.848+00
4000.	8.486+00	1.806-02	5.564+00	1.271-01	2.777+00
5000.	8.517+00	1.156-02	4.804+00	9.435-02	3.607+00
6000.	8.686+00	8.034-03	4.246+00	7.472-02	4.357+00
8000.	9.199+00	4.522-03	3.473+00	5.252-02	5.669+00
10000.	9.772+00	2.895-03	2.957+00	4.038-02	6.772+00
15000.	1.102+01	1.287-03	2.187+00	2.552-02	8.805+00
20000.	1.190+01	7.243-04	1.754+00	1.863-02	1.012+01
30000.	1.316+01	3.220-04	1.276+00	1.208-02	1.187+01
40000.	1.419+01	1.811-04	1.013+00	8.939-03	1.317+01
50000.	1.507+01	1.159-04	8.446-01	7.093-03	1.421+01
60000.	1.578+01	8.051-05	7.273-01	5.878-03	1.505+01
80000.	1.685+01	4.529-05	5.730-01	4.378-03	1.627+01
100000.	1.754+01	2.899-05	4.754-01	3.488-03	1.706+01

Z= 59 PRASEODYMIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.851+06	2.316+03	2.174-04	1.848+06
.015	1.016+08	2.316+03	4.884-04	1.016+08
.020	5.737+07	2.315+03	8.667-04	5.737+07
.030	1.883+07	2.315+03	1.943-03	1.883+07
.040	8.098+06	2.315+03	3.442-03	8.096+06
.050	4.499+06	2.315+03	5.359-03	4.497+06
.060	3.080+06	2.315+03	7.690-03	3.078+06
.080	2.118+06	2.314+03	1.357-02	2.115+06
.100	1.812+06	2.314+03	2.105-02	1.810+06
.150	1.731+06	2.311+03	4.651-02	1.729+06
.200	1.003+06	2.308+03	8.116-02	1.000+06
.300	1.107+06	2.298+03	1.757-01	1.105+06
.400	9.925+05	2.286+03	3.002-01	9.902+05
.500	8.381+05	2.271+03	4.499-01	8.358+05
.600	7.048+05	2.254+03	6.205-01	7.025+05
.800	5.153+05	2.214+03	1.006+00	5.130+05
1.000	2.424+06	2.170+03	1.419+00	2.422+06
1.500	1.190+06	2.051+03	2.434+00	1.188+06
2.000	6.391+05	1.929+03	3.400+00	6.372+05
3.000	2.387+05	1.693+03	5.194+00	2.370+05
4.000	1.174+05	1.485+03	6.809+00	1.159+05
5.000	6.765+04	1.305+03	8.263+00	6.633+04
6.000	1.240+05	1.153+03	9.576+00	1.228+05
8.000	9.172+04	9.190+02	1.185+01	9.079+04
10.000	5.197+04	7.501+02	1.376+01	5.121+04
15.000	1.773+04	4.945+02	1.737+01	1.722+04
20.000	8.161+03	3.515+02	1.988+01	7.790+03
30.000	2.752+03	2.048+02	2.291+01	2.525+03
40.000	1.297+03	1.314+02	2.457+01	1.141+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	3.741+03	9.082+01	2.546+01	3.625+03	
60.	2.323+03	6.634+01	2.589+01	2.230+03	
80.	1.085+03	3.972+01	2.591+01	1.019+03	
100.	6.020+02	2.637+01	2.578+01	5.499+02	
150.	2.132+02	1.230+01	2.442+01	1.765+02	
200.	1.086+02	7.088+00	2.288+01	7.860+01	
300.	4.912+01	3.226+00	2.032+01	2.557+01	
400.	3.207+01	1.836+00	1.838+01	1.186+01	
500.	2.476+01	1.183+00	1.686+01	6.715+00	
600.	2.079+01	8.257-01	1.565+01	4.314+00	
800.	1.649+01	4.672-01	1.379+01	2.241+00	
1000.	1.411+01	3.001-01	1.241+01	1.397+00	
1500.	1.110+01	1.340-01	1.011+01	6.396-01	2.220-01
2000.	9.914+00	7.554-02	8.627+00	3.885-01	8.225-01
3000.	8.932+00	3.365-02	6.787+00	2.059-01	1.906+00
4000.	8.661+00	1.895-02	5.660+00	1.366-01	2.846+00
5000.	8.683+00	1.214-02	4.887+00	1.012-01	3.683+00
6000.	8.849+00	8.433-03	4.319+00	8.005-02	4.442+00
8000.	9.373+00	4.746-03	3.533+00	5.617-02	5.779+00
10000.	9.974+00	3.039-03	3.008+00	4.314-02	6.921+00
15000.	1.132+01	1.351-03	2.224+00	2.721-02	9.071+00
20000.	1.228+01	7.602-04	1.784+00	1.985-02	1.048+01
30000.	1.360+01	3.379-04	1.298+00	1.286-02	1.229+01
40000.	1.466+01	1.901-04	1.030+00	9.510-03	1.362+01
50000.	1.555+01	1.217-04	8.592-01	7.543-03	1.469+01
60000.	1.629+01	8.450-05	7.398-01	6.250-03	1.555+01
80000.	1.739+01	4.754-05	5.829-01	4.654-03	1.680+01
100000.	1.810+01	3.042-05	4.836-01	3.707-03	1.761+01

Z= 60 NEODYMIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.529+09	2.395+03	2.147-04	1.529+09
.015	2.225+08	2.395+03	4.822-04	2.225+08
.020	5.864+07	2.395+03	8.558-04	5.864+07
.030	1.430+07	2.395+03	1.919-03	1.429+07
.040	8.185+06	2.394+03	3.399-03	8.183+06
.050	5.851+06	2.394+03	5.292-03	5.849+06
.060	4.436+06	2.394+03	7.594-03	4.434+06
.080	2.724+06	2.393+03	1.340-02	2.721+06
.100	1.757+06	2.393+03	2.079-02	1.754+06
.150	1.950+06	2.390+03	4.594-02	1.947+06
.200	1.024+06	2.387+03	8.017-02	1.022+06
.300	1.170+06	2.378+03	1.736-01	1.168+06
.400	1.044+06	2.365+03	2.966-01	1.041+06
.500	8.671+05	2.350+03	4.447-01	8.648+05
.600	7.155+05	2.333+03	6.134-01	7.132+05
.800	5.037+05	2.293+03	9.947-01	5.014+05
1.000	2.589+06	2.249+03	1.405+00	2.586+06
1.500	1.244+06	2.129+03	2.415+00	1.242+06
2.000	6.774+05	2.005+03	3.381+00	6.754+05
3.000	2.548+05	1.763+03	5.182+00	2.530+05
4.000	1.258+05	1.548+03	6.808+00	1.243+05
5.000	7.243+04	1.362+03	8.273+00	7.106+04
6.000	4.592+04	1.203+03	9.598+00	4.470+04
8.000	9.744+04	9.581+02	1.190+01	9.647+04
10.000	5.529+04	7.804+02	1.383+01	5.450+04
15.000	1.889+04	5.082+02	1.751+01	1.837+04
20.000	8.703+03	3.658+02	2.008+01	8.317+03
30.000	2.936+03	2.136+02	2.320+01	2.699+03
40.000	1.382+03	1.372+02	2.490+01	1.220+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	3.951+03	9.491+01	2.581+01	3.830+03	
60.	2.454+03	6.936+01	2.626+01	2.358+03	
80.	1.148+03	4.154+01	2.630+01	1.080+03	
100.	6.379+02	2.759+01	2.618+01	5.841+02	
150.	2.257+02	1.288+01	2.482+01	1.880+02	
200.	1.145+02	7.419+00	2.326+01	8.383+01	
300.	5.135+01	3.377+00	2.066+01	2.731+01	
400.	3.331+01	1.922+00	1.869+01	1.270+01	
500.	2.561+01	1.239+00	1.715+01	7.224+00	
600.	2.143+01	8.646-01	1.591+01	4.658+00	
800.	1.694+01	4.892-01	1.402+01	2.426+00	
1000.	1.445+01	3.142-01	1.262+01	1.513+00	
1500.	1.134+01	1.403-01	1.028+01	6.915-01	2.342-01
2000.	1.009+01	7.911-02	8.773+00	4.192-01	8.139-01
3000.	9.118+00	3.524-02	6.902+00	2.216-01	1.959+00
4000.	8.921+00	1.985-02	5.756+00	1.468-01	2.998+00
5000.	9.013+00	1.271-02	4.970+00	1.088-01	3.922+00
6000.	9.225+00	8.831-03	4.392+00	8.599-02	4.738+00
8000.	9.756+00	4.970-03	3.593+00	6.031-02	6.098+00
10000.	1.028+01	3.182-03	3.059+00	4.632-02	7.171+00
15000.	1.138+01	1.415-03	2.262+00	2.921-02	9.085+00
20000.	1.232+01	7.961-04	1.814+00	2.130-02	1.048+01
30000.	1.396+01	3.539-04	1.320+00	1.381-02	1.263+01
40000.	1.522+01	1.991-04	1.048+00	1.021-02	1.416+01
50000.	1.615+01	1.274-04	8.738-01	8.096-03	1.527+01
60000.	1.687+01	8.850-05	7.523-01	6.708-03	1.611+01
80000.	1.795+01	4.978-05	5.927-01	4.995-03	1.735+01
100000.	1.877+01	3.186-05	4.918-01	3.979-03	1.827+01

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 61 PROMETHIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	3.804+07	2.475+03	2.121-04	3.804+07	
.015	2.536+07	2.475+03	4.763-04	2.536+07	
.020	1.902+07	2.475+03	8.453-04	1.902+07	
.030	1.268+07	2.475+03	1.895-03	1.268+07	
.040	9.512+06	2.475+03	3.357-03	9.510+06	
.050	7.610+06	2.475+03	5.228-03	7.608+06	
.060	6.342+06	2.474+03	7.501-03	6.340+06	
.080	4.757+06	2.474+03	1.324-02	4.755+06	
.100	3.806+06	2.473+03	2.054-02	3.804+06	
.150	4.071+06	2.471+03	4.538-02	4.069+06	
.200	3.177+06	2.467+03	7.920-02	3.174+06	
.300	2.081+06	2.458+03	1.716-01	2.079+06	
.400	1.485+06	2.446+03	2.932-01	1.483+06	
.500	1.131+06	2.431+03	4.397-01	1.129+06	
.600	9.023+05	2.414+03	6.066-01	8.999+05	
.800	6.315+05	2.374+03	9.841-01	6.292+05	
1.000	4.802+05	2.329+03	1.391+00	4.778+05	
1.500	1.341+06	2.209+03	2.395+00	1.339+06	
2.000	7.239+05	2.083+03	3.360+00	7.219+05	
3.000	2.730+05	1.836+03	5.166+00	2.712+05	
4.000	1.345+05	1.615+03	6.799+00	1.329+05	
5.000	7.735+04	1.421+03	8.274+00	7.593+04	
6.000	4.909+04	1.257+03	9.609+00	4.782+04	
8.000	1.042+05	1.001+03	1.193+01	1.032+05	
10.000	5.814+04	8.157+02	1.389+01	5.731+04	
15.000	1.986+04	5.354+02	1.763+01	1.931+04	
20.000	9.252+03	3.807+02	2.026+01	8.851+03	
30.000	3.165+03	2.228+02	2.345+01	2.919+03	
40.000	1.480+03	1.433+02	2.521+01	1.311+03	
50.	4.191+03	9.917+01	2.615+01	4.066+03	
60.	2.607+03	7.251+01	2.662+01	2.508+03	
80.	1.219+03	4.345+01	2.668+01	1.149+03	
100.	6.771+02	2.887+01	2.657+01	6.217+02	
150.	2.399+02	1.348+01	2.520+01	2.012+02	
200.	1.216+02	7.767+00	2.362+01	9.024+01	
300.	5.417+01	3.536+00	2.099+01	2.964+01	
400.	3.481+01	2.013+00	1.899+01	1.381+01	
500.	2.654+01	1.298+00	1.743+01	7.817+00	
600.	2.209+01	9.055-01	1.617+01	5.015+00	
800.	1.736+01	5.124-01	1.425+01	2.600+00	
1000.	1.478+01	3.291-01	1.283+01	1.620+00	
1500.	1.158+01	1.470-01	1.045+01	7.406-01	2.458-01
2000.	1.028+01	8.286-02	8.919+00	4.495-01	8.311-01
3000.	9.320+00	3.692-02	7.017+00	2.380-01	2.028+00
4000.	9.159+00	2.079-02	5.852+00	1.578-01	3.129+00
5000.	9.287+00	1.331-02	5.053+00	1.169-01	4.105+00
6000.	9.526+00	9.251-03	4.466+00	9.240-02	4.959+00
8000.	1.007+01	5.207-03	3.652+00	6.480-02	6.352+00
10000.	1.058+01	3.333-03	3.110+00	4.975-02	7.417+00
15000.	1.161+01	1.482-03	2.300+00	3.137-02	9.277+00
20000.	1.256+01	8.340-04	1.845+00	2.287-02	1.069+01
30000.	1.432+01	3.707-04	1.342+00	1.482-02	1.297+01
40000.	1.562+01	2.086-04	1.065+00	1.095-02	1.454+01
50000.	1.653+01	1.335-04	8.883-01	8.687-03	1.563+01
60000.	1.722+01	9.271-05	7.649-01	7.197-03	1.645+01
80000.	1.827+01	5.215-05	6.026-01	5.359-03	1.767+01
100000.	1.915+01	3.338-05	5.000-01	4.268-03	1.865+01

Z= 62 SAMARIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.094+07	2.557+03	2.061-04	4.094+07	
.015	2.730+07	2.557+03	4.630-04	2.729+07	
.020	2.047+07	2.557+03	8.217-04	2.047+07	
.030	1.365+07	2.557+03	1.842-03	1.365+07	
.040	1.024+07	2.557+03	3.264-03	1.023+07	
.050	8.190+06	2.557+03	5.082-03	8.188+06	
.060	6.826+06	2.556+03	7.293-03	6.823+06	
.080	5.120+06	2.556+03	1.287-02	5.117+06	
.100	4.096+06	2.555+03	1.997-02	4.094+06	
.150	7.810+06	2.553+03	4.414-02	7.808+06	
.200	6.258+06	2.549+03	7.706-02	6.256+06	
.300	3.972+06	2.540+03	1.670-01	3.969+06	
.400	2.626+06	2.528+03	2.856-01	2.624+06	
.500	1.834+06	2.513+03	4.286-01	1.831+06	
.600	1.341+06	2.496+03	5.918-01	1.338+06	
.800	7.936+05	2.456+03	9.617-01	7.912+05	
1.000	5.167+05	2.411+03	1.362+00	5.143+05	
1.500	1.342+06	2.290+03	2.360+00	1.340+06	
2.000	7.722+05	2.162+03	3.330+00	7.700+05	
3.000	2.916+05	1.911+03	5.160+00	2.897+05	
4.000	1.437+05	1.683+03	6.811+00	1.420+05	
5.000	8.258+04	1.482+03	8.293+00	8.109+04	
6.000	5.238+04	1.311+03	9.629+00	5.106+04	
8.000	1.087+05	1.045+03	1.195+01	1.077+05	
10.000	6.232+04	8.511+02	1.393+01	6.146+04	
15.000	2.151+04	5.562+02	1.776+01	2.094+04	
20.000	9.933+03	3.961+02	2.048+01	9.517+03	
30.000	3.350+03	2.334+02	2.377+01	3.093+03	
40.000	1.572+03	1.507+02	2.557+01	1.396+03	
50.	4.414+03	1.046+02	2.653+01	4.283+03	
60.	2.752+03	7.665+01	2.700+01	2.648+03	
80.	1.294+03	4.604+01	2.706+01	1.221+03	
100.	7.213+02	3.063+01	2.696+01	6.638+02	
150.	2.554+02	1.433+01	2.559+01	2.155+02	
200.	1.288+02	8.264+00	2.399+01	9.653+01	
300.	5.671+01	3.766+00	2.133+01	3.161+01	
400.	3.617+01	2.145+00	1.930+01	1.473+01	
500.	2.746+01	1.383+00	1.771+01	8.368+00	
600.	2.279+01	9.652-01	1.644+01	5.391+00	
800.	1.784+01	5.463-01	1.448+01	2.804+00	
1000.	1.514+01	3.509-01	1.304+01	1.748+00	
1500.	1.183+01	1.567-01	1.062+01	7.989-01	2.574-01
2000.	1.051+01	8.838-02	9.065+00	4.843-01	8.693-01
3000.	9.530+00	3.938-02	7.132+00	2.559-01	2.103+00
4000.	9.370+00	2.218-02	5.948+00	1.694-01	3.230+00
5000.	9.504+00	1.420-02	5.136+00	1.254-01	4.229+00
6000.	9.752+00	9.869-03	4.539+00	9.912-02	5.104+00
8000.	1.033+01	5.555-03	3.712+00	6.948-02	6.542+00
10000.	1.087+01	3.556-03	3.161+00	5.333-02	7.653+00
15000.	1.200+01	1.581-03	2.337+00	3.361-02	9.624+00
20000.	1.302+01	8.897-04	1.875+00	2.450-02	1.112+01
30000.	1.486+01	3.955-04	1.363+00	1.587-02	1.348+01
40000.	1.621+01	2.225-04	1.082+00	1.173-02	1.511+01
50000.	1.716+01	1.424-04	9.029-01	9.303-03	1.625+01
60000.	1.788+01	9.891-05	7.774-01	7.707-03	1.710+01
80000.	1.898+01	5.564-05	6.125-01	5.739-03	1.836+01
100000.	1.986+01	3.561-05	5.082-01	4.571-03	1.934+01

Z= 63 EUROPIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.189+07	2.640+03	2.070-04	4.188+07	
.015	2.792+07	2.640+03	4.649-04	2.792+07	
.020	2.094+07	2.640+03	8.250-04	2.094+07	
.030	1.396+07	2.640+03	1.850-03	1.396+07	
.040	1.047+07	2.640+03	3.277-03	1.047+07	
.050	8.379+06	2.640+03	5.102-03	8.377+06	
.060	6.983+06	2.639+03	7.322-03	6.981+06	
.080	5.238+06	2.639+03	1.292-02	5.235+06	
.100	4.191+06	2.638+03	2.005-02	4.188+06	
.150	8.341+06	2.636+03	4.431-02	8.338+06	
.200	6.508+06	2.632+03	7.734-02	6.505+06	
.300	4.108+06	2.623+03	1.676-01	4.105+06	
.400	2.724+06	2.611+03	2.865-01	2.722+06	
.500	1.910+06	2.596+03	4.298-01	1.908+06	
.600	1.403+06	2.579+03	5.932-01	1.400+06	
.800	8.380+05	2.539+03	9.635-01	8.355+05	
1.000	5.508+05	2.494+03	1.363+00	5.483+05	
1.500	1.430+06	2.372+03	2.356+00	1.428+06	
2.000	8.179+05	2.243+03	3.318+00	8.157+05	
3.000	3.091+05	1.987+03	5.129+00	3.071+05	
4.000	1.528+05	1.752+03	6.773+00	1.510+05	
5.000	8.802+04	1.545+03	8.262+00	8.647+04	
6.000	5.592+04	1.367+03	9.612+00	5.455+04	
8.000	1.009+05	1.088+03	1.197+01	9.983+04	
10.000	6.592+04	8.845+02	1.398+01	6.502+04	
15.000	2.282+04	5.689+02	1.785+01	2.223+04	
20.000	1.058+04	4.120+02	2.060+01	1.015+04	
30.000	3.582+03	2.420+02	2.399+01	3.316+03	
40.000	1.678+03	1.559+02	2.585+01	1.497+03	
50.	4.656+03	1.080+02	2.685+01	4.521+03	
60.	2.905+03	7.904+01	2.735+01	2.799+03	
80.	1.367+03	4.740+01	2.743+01	1.292+03	
100.	7.618+02	3.151+01	2.735+01	7.029+02	
150.	2.697+02	1.472+01	2.598+01	2.290+02	
200.	1.358+02	8.484+00	2.437+01	1.029+02	
300.	5.940+01	3.864+00	2.167+01	3.387+01	
400.	3.763+01	2.200+00	1.961+01	1.582+01	
500.	2.842+01	1.418+00	1.800+01	9.000+00	
600.	2.349+01	9.897-01	1.670+01	5.799+00	
800.	1.829+01	5.600-01	1.472+01	3.017+00	
1000.	1.549+01	3.597-01	1.325+01	1.881+00	
1500.	1.208+01	1.606-01	1.079+01	8.591-01	2.672-01
2000.	1.074+01	9.058-02	9.212+00	5.204-01	9.148-01
3000.	9.746+00	4.035-02	7.247+00	2.747-01	2.184+00
4000.	9.576+00	2.273-02	6.043+00	1.818-01	3.328+00
5000.	9.707+00	1.456-02	5.218+00	1.345-01	4.340+00
6000.	9.961+00	1.011-02	4.612+00	1.063-01	5.232+00
8000.	1.057+01	5.692-03	3.772+00	7.446-02	6.715+00
10000.	1.115+01	3.644-03	3.212+00	5.713-02	7.882+00
15000.	1.238+01	1.620-03	2.375+00	3.599-02	9.963+00
20000.	1.341+01	9.117-04	1.905+00	2.623-02	1.148+01
30000.	1.519+01	4.053-04	1.385+00	1.699-02	1.379+01
40000.	1.654+01	2.280-04	1.100+00	1.255-02	1.542+01
50000.	1.753+01	1.459-04	9.175-01	9.955-03	1.661+01
60000.	1.831+01	1.013-04	7.900-01	8.247-03	1.751+01
80000.	1.946+01	5.701-05	6.224-01	6.140-03	1.883+01
100000.	2.034+01	3.649-05	5.164-01	4.890-03	1.982+01

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 64 GADOLINIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	4.439+07	2.725+03	2.078-04	4.439+07
.015	2.959+07	2.725+03	4.667-04	2.959+07
.020	2.220+07	2.725+03	8.282-04	2.219+07
.030	1.480+07	2.724+03	1.857-03	1.480+07
.040	1.110+07	2.724+03	3.290-03	1.110+07
.050	8.880+06	2.724+03	5.122-03	8.877+06
.060	7.401+06	2.724+03	7.350-03	7.398+06
.080	5.551+06	2.723+03	1.298-02	5.548+06
.100	4.441+06	2.723+03	2.013-02	4.439+06
.150	1.061+07	2.720+03	4.449-02	1.061+07
.200	7.640+06	2.717+03	7.765-02	7.638+06
.300	4.486+06	2.707+03	1.683-01	4.483+06
.400	2.906+06	2.695+03	2.877-01	2.903+06
.500	2.023+06	2.680+03	4.317-01	2.021+06
.600	1.486+06	2.662+03	5.959-01	1.484+06
.800	8.979+05	2.621+03	9.680-01	8.953+05
1.000	6.006+05	2.575+03	1.370+00	5.981+05
1.500	1.321+06	2.448+03	2.370+00	1.319+06
2.000	8.701+05	2.313+03	3.340+00	8.678+05
3.000	3.295+05	2.047+03	5.171+00	3.274+05
4.000	1.634+05	1.807+03	6.835+00	1.616+05
5.000	9.430+04	1.596+03	8.342+00	9.270+04
6.000	5.989+04	1.415+03	9.709+00	5.847+04
8.000	1.083+05	1.130+03	1.210+01	1.072+05
10.000	6.965+04	9.208+02	1.413+01	6.871+04
15.000	2.421+04	6.012+02	1.804+01	2.359+04
20.000	1.124+04	4.274+02	2.082+01	1.080+04
30.000	3.813+03	2.518+02	2.427+01	3.537+03
40.000	1.785+03	1.626+02	2.618+01	1.596+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.000+03	1.128+02	2.720+01	8.602+02	
60.	3.071+03	8.258+01	2.772+01	2.961+03	
80.	1.449+03	4.957+01	2.780+01	1.372+03	
100.	8.058+02	3.297+01	2.774+01	7.451+02	
150.	2.841+02	1.541+01	2.636+01	2.424+02	
200.	1.429+02	8.889+00	2.473+01	1.093+02	
300.	6.227+01	4.050+00	2.199+01	3.623+01	
400.	3.922+01	2.306+00	1.991+01	1.701+01	
500.	2.945+01	1.487+00	1.828+01	9.691+00	
600.	2.424+01	1.038+00	1.696+01	6.246+00	
800.	1.879+01	5.873-01	1.495+01	3.249+00	
1000.	1.586+01	3.772-01	1.346+01	2.025+00	
1500.	1.233+01	1.685-01	1.096+01	9.242-01	2.782-01
2000.	1.096+01	9.500-02	9.357+00	5.594-01	9.515-01
3000.	9.949+00	4.233-02	7.362+00	2.950-01	2.250+00
4000.	9.768+00	2.384-02	6.139+00	1.950-01	3.410+00
5000.	9.897+00	1.527-02	5.301+00	1.442-01	4.436+00
6000.	1.015+01	1.061-02	4.685+00	1.139-01	5.344+00
8000.	1.078+01	5.970-03	3.832+00	7.974-02	6.865+00
10000.	1.141+01	3.822-03	3.263+00	6.116-02	8.078+00
15000.	1.273+01	1.700-03	2.413+00	3.851-02	1.027+01
20000.	1.382+01	9.563-04	1.935+00	2.805-02	1.186+01
30000.	1.565+01	4.251-04	1.407+00	1.816-02	1.422+01
40000.	1.703+01	2.392-04	1.117+00	1.342-02	1.590+01
50000.	1.807+01	1.531-04	9.320-01	1.064-02	1.713+01
60000.	1.887+01	1.063-04	8.025-01	8.816-03	1.806+01
80000.	2.007+01	5.980-05	6.323-01	6.563-03	1.943+01
100000.	2.095+01	3.827-05	5.246-01	5.227-03	2.042+01

Z= 65 TERBIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	4.539+07	2.810+03	2.020-04	4.539+07
.015	3.026+07	2.810+03	4.537-04	3.026+07
.020	2.270+07	2.810+03	8.052-04	2.269+07
.030	1.513+07	2.810+03	1.806-03	1.513+07
.040	1.135+07	2.810+03	3.199-03	1.135+07
.050	9.080+06	2.810+03	4.981-03	9.078+06
.060	7.567+06	2.810+03	7.148-03	7.565+06
.080	5.676+06	2.809+03	1.262-02	5.673+06
.100	4.542+06	2.808+03	1.958-02	4.539+06
.150	1.156+07	2.806+03	4.328-02	1.156+07
.200	8.445+06	2.803+03	7.557-02	8.442+06
.300	4.946+06	2.794+03	1.639-01	4.944+06
.400	3.179+06	2.781+03	2.803-01	3.176+06
.500	2.195+06	2.766+03	4.209-01	2.192+06
.600	1.599+06	2.749+03	5.815-01	1.596+06
.800	9.499+05	2.709+03	9.462-01	9.472+05
1.000	6.249+05	2.664+03	1.342+00	6.223+05
1.500	1.405+06	2.540+03	2.336+00	1.403+06
2.000	9.236+05	2.408+03	3.311+00	9.212+05
3.000	3.508+05	2.143+03	5.167+00	3.486+05
4.000	1.732+05	1.897+03	6.851+00	1.713+05
5.000	9.975+04	1.676+03	8.368+00	9.806+04
6.000	6.341+04	1.485+03	9.742+00	6.191+04
8.000	8.225+04	1.185+03	1.214+01	8.105+04
10.000	7.336+04	9.640+02	1.419+01	7.238+04
15.000	2.577+04	6.257+02	1.818+01	2.512+04
20.000	1.200+04	4.455+02	2.103+01	1.153+04
30.000	4.070+03	2.628+02	2.454+01	3.782+03
40.000	1.904+03	1.698+02	2.650+01	1.708+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.067+03	1.179+02	2.755+01	9.220+02	
60.	3.235+03	8.634+01	2.809+01	3.121+03	
80.	1.536+03	5.186+01	2.818+01	1.456+03	
100.	8.557+02	3.450+01	2.812+01	7.931+02	
150.	3.013+02	1.614+01	2.674+01	2.584+02	
200.	1.508+02	9.309+00	2.510+01	1.164+02	
300.	6.512+01	4.242+00	2.233+01	3.854+01	
400.	4.073+01	2.416+00	2.022+01	1.809+01	
500.	3.045+01	1.558+00	1.856+01	1.033+01	
600.	2.498+01	1.087+00	1.722+01	6.669+00	
800.	1.927+01	6.153-01	1.518+01	3.476+00	
1000.	1.624+01	3.952-01	1.367+01	2.168+00	
1500.	1.258+01	1.765-01	1.113+01	9.895-01	2.873-01
2000.	1.121+01	9.954-02	9.504+00	5.988-01	1.004+00
3000.	1.017+01	4.435-02	7.477+00	3.155-01	2.338+00
4000.	9.976+00	2.498-02	6.235+00	2.085-01	3.507+00
5000.	1.009+01	1.600-02	5.384+00	1.542-01	4.539+00
6000.	1.035+01	1.111-02	4.758+00	1.217-01	5.456+00
8000.	1.100+01	6.256-03	3.892+00	8.520-02	7.016+00
10000.	1.167+01	4.005-03	3.314+00	6.534-02	8.288+00
15000.	1.312+01	1.781-03	2.451+00	4.113-02	1.062+01
20000.	1.427+01	1.002-03	1.966+00	2.996-02	1.227+01
30000.	1.611+01	4.455-04	1.429+00	1.939-02	1.466+01
40000.	1.754+01	2.506-04	1.135+00	1.433-02	1.639+01
50000.	1.865+01	1.604-04	9.466-01	1.136-02	1.769+01
60000.	1.951+01	1.114-04	8.150-01	9.413-03	1.868+01
80000.	2.073+01	6.266-05	6.421-01	7.007-03	2.008+01
100000.	2.153+01	4.011-05	5.328-01	5.581-03	2.099+01

Z= 66 DYSPROSIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	4.722+07	2.898+03	1.991-04	4.721+07
.015	3.148+07	2.898+03	4.473-04	3.148+07
.020	2.361+07	2.898+03	7.938-04	2.361+07
.030	1.574+07	2.897+03	1.780-03	1.574+07
.040	1.181+07	2.897+03	3.154-03	1.180+07
.050	9.446+06	2.897+03	4.910-03	9.443+06
.060	7.872+06	2.897+03	7.047-03	7.869+06
.080	5.905+06	2.896+03	1.244-02	5.902+06
.100	4.724+06	2.896+03	1.930-02	4.721+06
.150	3.150+06	2.893+03	4.266-02	3.148+06
.200	9.303+06	2.890+03	7.449-02	9.300+06
.300	5.410+06	2.881+03	1.615-01	5.407+06
.400	3.463+06	2.869+03	2.762-01	3.460+06
.500	2.383+06	2.854+03	4.147-01	2.380+06
.600	1.730+06	2.837+03	5.728-01	1.727+06
.800	1.021+06	2.797+03	9.317-01	1.018+06
1.000	6.667+05	2.751+03	1.321+00	6.639+05
1.500	1.498+06	2.627+03	2.296+00	1.495+06
2.000	9.381+05	2.493+03	3.251+00	9.356+05
3.000	3.738+05	2.224+03	5.073+00	3.716+05
4.000	1.841+05	1.971+03	6.743+00	1.821+05
5.000	1.057+05	1.744+03	8.265+00	1.040+05
6.000	6.714+04	1.548+03	9.654+00	6.558+04
8.000	8.882+04	1.235+03	1.210+01	8.758+04
10.000	7.783+04	1.005+03	1.418+01	7.681+04
15.000	2.726+04	6.510+02	1.821+01	2.659+04
20.000	1.273+04	4.632+02	2.112+01	1.224+04
30.000	4.339+03	2.737+02	2.475+01	4.040+03
40.000	2.033+03	1.770+02	2.678+01	1.829+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.136+03	1.230+02	2.787+01	9.849+02	
60.	3.413+03	9.014+01	2.842+01	3.294+03	
80.	1.622+03	5.417+01	2.853+01	1.539+03	
100.	9.033+02	3.606+01	2.850+01	8.387+02	
150.	3.176+02	1.687+01	2.711+01	2.736+02	
200.	1.586+02	9.735+00	2.545+01	1.234+02	
300.	6.804+01	4.437+00	2.265+01	4.095+01	
400.	4.230+01	2.528+00	2.051+01	1.926+01	
500.	3.148+01	1.630+00	1.884+01	1.101+01	
600.	2.574+01	1.137+00	1.748+01	7.120+00	
800.	1.977+01	6.438-01	1.541+01	3.715+00	
1000.	1.661+01	4.136-01	1.388+01	2.318+00	
1500.	1.285+01	1.847-01	1.130+01	1.057+00	3.020-01
2000.	1.141+01	1.042-01	9.649+00	6.396-01	1.018+00
3000.	1.039+01	4.641-02	7.592+00	3.368-01	2.415+00
4000.	1.024+01	2.614-02	6.331+00	2.225-01	3.665+00
5000.	1.041+01	1.674-02	5.467+00	1.645-01	4.764+00
6000.	1.070+01	1.163-02	4.832+00	1.298-01	5.727+00
8000.	1.136+01	6.547-03	3.952+00	9.087-02	7.313+00
10000.	1.199+01	4.192-03	3.364+00	6.968-02	8.552+00
15000.	1.330+01	1.864-03	2.488+00	4.386-02	1.076+01
20000.	1.444+01	1.049-03	1.996+00	3.195-02	1.241+01
30000.	1.644+01	4.662-04	1.451+00	2.068-02	1.497+01
40000.	1.793+01	2.623-04	1.152+00	1.528-02	1.676+01
50000.	1.902+01	1.679-04	9.611-01	1.212-02	1.805+01
60000.	1.985+01	1.166-04	8.276-01	1.004-02	1.902+01
80000.	2.110+01	6.558-05	6.520-01	7.471-03	2.044+01
100000.	2.206+01	4.197-05	5.410-01	5.950-03	2.152+01

TABLE II, CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 67 HOLMIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.848+07	2.986+03	1.974-04	4.848+07	
.015	3.232+07	2.986+03	4.433-04	3.232+07	
.020	2.424+07	2.986+03	7.867-04	2.424+07	
.030	1.616+07	2.986+03	1.764-03	1.616+07	
.040	1.212+07	2.986+03	3.125-03	1.212+07	
.050	9.698+06	2.986+03	4.867-03	9.695+06	
.060	8.082+06	2.985+03	6.984-03	8.079+06	
.080	6.063+06	2.985+03	1.233-02	6.060+06	
.100	4.851+06	2.984+03	1.913-02	4.848+06	
.150	3.235+06	2.982+03	4.229-02	3.232+06	
.200	8.965+06	2.978+03	7.383-02	8.962+06	
.300	5.459+06	2.969+03	1.601-01	5.456+06	
.400	3.553+06	2.956+03	2.739-01	3.550+06	
.500	2.467+06	2.941+03	4.111-01	2.464+06	
.600	1.803+06	2.924+03	5.679-01	1.800+06	
.800	1.073+06	2.882+03	9.240-01	1.070+06	
1.000	7.062+05	2.836+03	1.310+00	7.034+05	
1.500	1.603+06	2.707+03	2.280+00	1.601+06	
2.000	9.941+05	2.567+03	3.232+00	9.915+05	
3.000	3.963+05	2.288+03	5.052+00	3.940+05	
4.000	1.956+05	2.030+03	6.725+00	1.936+05	
5.000	1.123+05	1.799+03	8.255+00	1.105+05	
6.000	7.117+04	1.599+03	9.655+00	6.956+04	
8.000	3.458+04	1.280+03	1.212+01	3.329+04	
10.000	8.167+04	1.042+03	1.423+01	8.061+04	
15.000	2.901+04	6.733+02	1.832+01	2.832+04	
20.000	1.355+04	4.802+02	2.127+01	1.305+04	
30.000	4.598+03	2.843+02	2.500+01	4.289+03	
40.000	2.149+03	1.841+02	2.709+01	1.938+03	
50.	1.203+03	1.280+02	2.821+01	1.047+03	
60.	3.571+03	9.385+01	2.878+01	3.448+03	
80.	1.731+03	5.644+01	2.892+01	1.646+03	
100.	9.714+02	3.758+01	2.889+01	9.049+02	
150.	3.420+02	1.759+01	2.751+01	2.969+02	
200.	1.697+02	1.015+01	2.584+01	1.338+02	
300.	7.172+01	4.629+00	2.300+01	4.409+01	
400.	4.410+01	2.637+00	2.083+01	2.064+01	
500.	3.260+01	1.701+00	1.912+01	1.178+01	
600.	2.655+01	1.187+00	1.775+01	7.610+00	
800.	2.029+01	6.719-01	1.565+01	3.974+00	
1000.	1.701+01	4.316-01	1.409+01	2.482+00	
1500.	1.311+01	1.928-01	1.147+01	1.135+00	3.101-01
2000.	1.165+01	1.087-01	9.796+00	6.871-01	1.061+00
3000.	1.060+01	4.844-02	7.707+00	3.619-01	2.485+00
4000.	1.044+01	2.728-02	6.427+00	2.390-01	3.743+00
5000.	1.059+01	1.747-02	5.550+00	1.765-01	4.848+00
6000.	1.088+01	1.214-02	4.905+00	1.393-01	5.822+00
8000.	1.157+01	6.833-03	4.012+00	9.736-02	7.454+00
10000.	1.226+01	4.375-03	3.415+00	7.460-02	8.762+00
15000.	1.373+01	1.945-03	2.526+00	4.690-02	1.116+01
20000.	1.496+01	1.095-03	2.026+00	3.414-02	1.290+01
30000.	1.697+01	4.866-04	1.473+00	2.208-02	1.548+01
40000.	1.847+01	2.737-04	1.170+00	1.631-02	1.729+01
50000.	1.960+01	1.752-04	9.757-01	1.293-02	1.862+01
60000.	2.049+01	1.217-04	8.401-01	1.071-02	1.964+01
80000.	2.182+01	6.845-05	6.619-01	7.968-03	2.115+01
100000.	2.280+01	4.381-05	5.492-01	6.345-03	2.225+01

Z= 68 ERBIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	4.999+07	3.076+03	1.916-04	4.998+07	
.015	3.333+07	3.076+03	4.303-04	3.332+07	
.020	2.500+07	3.076+03	7.637-04	2.499+07	
.030	1.666+07	3.076+03	1.712-03	1.666+07	
.040	1.250+07	3.076+03	3.034-03	1.250+07	
.050	1.000+07	3.075+03	4.725-03	9.997+06	
.060	8.334+06	3.075+03	6.781-03	8.331+06	
.080	6.251+06	3.075+03	1.197-02	6.248+06	
.100	5.002+06	3.074+03	1.858-02	4.998+06	
.150	3.335+06	3.072+03	4.108-02	3.332+06	
.200	1.010+07	3.068+03	7.175-02	1.009+07	
.300	6.012+06	3.059+03	1.557-01	6.009+06	
.400	3.896+06	3.047+03	2.665-01	3.893+06	
.500	2.697+06	3.032+03	4.004-01	2.694+06	
.600	1.964+06	3.015+03	5.536-01	1.961+06	
.800	1.161+06	2.975+03	9.024-01	1.158+06	
1.000	7.569+05	2.930+03	1.282+00	7.539+05	
1.500	1.697+06	2.804+03	2.247+00	1.694+06	
2.000	9.820+05	2.668+03	3.205+00	9.793+05	
3.000	4.180+05	2.391+03	5.051+00	4.156+05	
4.000	2.073+05	2.127+03	6.742+00	2.051+05	
5.000	1.194+05	1.886+03	8.279+00	1.175+05	
6.000	7.586+04	1.677+03	9.680+00	7.417+04	
8.000	3.677+04	1.342+03	1.215+01	3.542+04	
10.000	8.515+04	1.093+03	1.427+01	8.405+04	
15.000	3.081+04	7.111+02	1.846+01	3.009+04	
20.000	1.444+04	5.006+02	2.149+01	1.392+04	
30.000	4.891+03	2.958+02	2.529+01	4.570+03	
40.000	2.280+03	1.915+02	2.743+01	2.061+03	
50.	1.275+03	1.331+02	2.859+01	1.114+03	
60.	3.756+03	9.761+01	2.918+01	3.629+03	
80.	1.797+03	5.870+01	2.933+01	1.709+03	
100.	1.005+03	3.908+01	2.930+01	9.367+02	
150.	3.545+02	1.829+01	2.793+01	3.083+02	
200.	1.767+02	1.056+01	2.624+01	1.399+02	
300.	7.492+01	4.814+00	2.336+01	4.674+01	
400.	4.596+01	2.742+00	2.115+01	2.206+01	
500.	3.381+01	1.768+00	1.942+01	1.263+01	
600.	2.742+01	1.234+00	1.802+01	8.162+00	
800.	2.084+01	6.986-01	1.588+01	4.262+00	
1000.	1.741+01	4.488-01	1.430+01	2.661+00	
1500.	1.338+01	2.005-01	1.165+01	1.215+00	3.222-01
2000.	1.190+01	1.130-01	9.942+00	7.347-01	1.113+00
3000.	1.084+01	5.037-02	7.822+00	3.864-01	2.580+00
4000.	1.067+01	2.837-02	6.523+00	2.549-01	3.859+00
5000.	1.082+01	1.817-02	5.632+00	1.882-01	4.978+00
6000.	1.111+01	1.262-02	4.978+00	1.484-01	5.966+00
8000.	1.181+01	7.105-03	4.072+00	1.037-01	7.632+00
10000.	1.254+01	4.549-03	3.466+00	7.946-02	8.986+00
15000.	1.412+01	2.023-03	2.564+00	4.993-02	1.150+01
20000.	1.541+01	1.138-03	2.056+00	3.634-02	1.332+01
30000.	1.744+01	5.060-04	1.495+00	2.350-02	1.592+01
40000.	1.895+01	2.846-04	1.187+00	1.736-02	1.774+01
50000.	2.010+01	1.822-04	9.903-01	1.376-02	1.910+01
60000.	2.102+01	1.265-04	8.527-01	1.139-02	2.015+01
80000.	2.239+01	7.117-05	6.718-01	8.479-03	2.171+01
100000.	2.339+01	4.555-05	5.573-01	6.751-03	2.283+01

Z= 69 THULIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	5.106+07	3.167+03	1.936-04	5.106+07	
.015	3.404+07	3.167+03	4.350-04	3.404+07	
.020	2.553+07	3.167+03	7.719-04	2.553+07	
.030	1.702+07	3.167+03	1.731-03	1.702+07	
.040	1.277+07	3.167+03	3.067-03	1.276+07	
.050	1.021+07	3.167+03	4.775-03	1.021+07	
.060	8.513+06	3.166+03	6.853-03	8.510+06	
.080	6.385+06	3.166+03	1.210-02	6.382+06	
.100	5.109+06	3.165+03	1.877-02	5.106+06	
.150	3.407+06	3.163+03	4.150-02	3.404+06	
.200	1.112+07	3.159+03	7.247-02	1.112+07	
.300	6.368+06	3.150+03	1.572-01	6.365+06	
.400	4.108+06	3.138+03	2.689-01	4.105+06	
.500	2.846+06	3.123+03	4.038-01	2.843+06	
.600	2.076+06	3.106+03	5.579-01	2.073+06	
.800	1.231+06	3.066+03	9.082-01	1.228+06	
1.000	8.054+05	3.020+03	1.289+00	8.023+05	
1.500	1.199+06	2.894+03	2.247+00	1.196+06	
2.000	1.041+06	2.757+03	3.191+00	1.039+06	
3.000	4.415+05	2.476+03	5.005+00	4.390+05	
4.000	2.195+05	2.207+03	6.683+00	2.173+05	
5.000	1.266+05	1.960+03	8.224+00	1.247+05	
6.000	8.048+04	1.745+03	9.640+00	7.873+04	
8.000	3.897+04	1.398+03	1.215+01	3.756+04	
10.000	7.951+04	1.139+03	1.430+01	7.836+04	
15.000	3.234+04	7.413+02	1.848+01	3.158+04	
20.000	1.522+04	5.203+02	2.154+01	1.468+04	
30.000	5.182+03	3.073+02	2.546+01	4.849+03	
40.000	2.417+03	1.989+02	2.768+01	2.190+03	
50.	1.348+03	1.382+02	2.887+01	1.181+03	
60.	3.943+03	1.013+02	2.947+01	3.812+03	
80.	1.891+03	6.093+01	2.964+01	1.800+03	
100.	1.058+03	4.056+01	2.965+01	9.883+02	
150.	3.734+02	1.899+01	2.827+01	3.262+02	
200.	1.858+02	1.096+01	2.656+01	1.483+02	
300.	7.834+01	4.996+00	2.366+01	4.969+01	
400.	4.777+01	2.846+00	2.143+01	2.349+01	
500.	3.498+01	1.835+00	1.968+01	1.346+01	
600.	2.826+01	1.281+00	1.827+01	8.703+00	
800.	2.138+01	7.250-01	1.611+01	4.547+00	
1000.	1.782+01	4.658-01	1.451+01	2.839+00	
1500.	1.366+01	2.080-01	1.182+01	1.297+00	3.366-01
2000.	1.214+01	1.173-01	1.009+01	7.840-01	1.153+00
3000.	1.106+01	5.227-02	7.937+00	4.122-01	2.661+00
4000.	1.089+01	2.944-02	6.619+00	2.718-01	3.971+00
5000.	1.105+01	1.886-02	5.715+00	2.006-01	5.115+00
6000.	1.135+01	1.310-02	5.051+00	1.582-01	6.123+00
8000.	1.207+01	7.374-03	4.131+00	1.105-01	7.817+00
10000.	1.279+01	4.721-03	3.517+00	8.462-02	9.186+00
15000.	1.437+01	2.099-03	2.601+00	5.316-02	1.171+01
20000.	1.566+01	1.181-03	2.087+00	3.868-02	1.354+01
30000.	1.778+01	5.251-04	1.517+00	2.501-02	1.624+01
40000.	1.940+01	2.954-04	1.205+00	1.847-02	1.818+01
50000.	2.065+01	1.891-04	1.005+00	1.464-02	1.963+01
60000.	2.163+01	1.313-04	8.652-01	1.212-02	2.076+01
80000.	2.308+01	7.386-05	6.817-01	9.019-03	2.239+01
100000.	2.409+01	4.727-05	5.655-01	7.182-03	2.352+01

TABLE II. CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 70 YTTERBIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	5.316+07	3.259+03	1.921-04	5.316+07
.015	3.544+07	3.259+03	4.316-04	3.544+07
.020	2.658+07	3.259+03	7.660-04	2.658+07
.030	1.772+07	3.259+03	1.718-03	1.772+07
.040	1.329+07	3.259+03	3.043-03	1.329+07
.050	1.063+07	3.259+03	4.739-03	1.063+07
.060	8.863+06	3.259+03	6.800-03	8.860+06
.080	6.648+06	3.258+03	1.201-02	6.645+06
.100	5.319+06	3.258+03	1.863-02	5.316+06
.150	3.547+06	3.255+03	4.118-02	3.544+06
.200	1.271+07	3.252+03	7.192-02	1.271+07
.300	7.174+06	3.243+03	1.560-01	7.171+06
.400	4.589+06	3.231+03	2.669-01	4.586+06
.500	3.160+06	3.216+03	4.008-01	3.157+06
.600	2.293+06	3.199+03	5.538-01	2.290+06
.800	1.347+06	3.159+03	9.017-01	1.344+06
1.000	8.741+05	3.113+03	1.280+00	8.709+05
1.500	3.805+05	2.986+03	2.233+00	3.775+05
2.000	1.102+06	2.848+03	3.173+00	1.099+06
3.000	4.648+05	2.563+03	4.984+00	4.622+05
4.000	2.316+05	2.288+03	6.663+00	2.293+05
5.000	1.338+05	2.036+03	8.207+00	1.318+05
6.000	8.516+04	1.814+03	9.630+00	8.334+04
8.000	4.143+04	1.454+03	1.215+01	3.996+04
10.000	8.447+04	1.184+03	1.432+01	8.327+04
15.000	3.407+04	7.678+02	1.855+01	3.328+04
20.000	1.604+04	5.407+02	2.165+01	1.548+04
30.000	5.501+03	3.190+02	2.565+01	5.156+03
40.000	2.576+03	2.064+02	2.793+01	2.342+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.435+03	1.434+02	2.916+01	1.263+03	
60.	8.930+02	1.051+02	2.979+01	7.580+02	
80.	1.976+03	6.320+01	2.998+01	1.883+03	
100.	1.108+03	4.207+01	3.002+01	1.036+03	
150.	3.916+02	1.969+01	2.864+01	3.432+02	
200.	1.946+02	1.136+01	2.692+01	1.564+02	
300.	8.174+01	5.180+00	2.399+01	5.257+01	
400.	4.962+01	2.951+00	2.174+01	2.493+01	
500.	3.620+01	1.903+00	1.996+01	1.433+01	
600.	2.916+01	1.328+00	1.853+01	9.294+00	
800.	2.196+01	7.518-01	1.634+01	4.866+00	
1000.	1.824+01	4.830-01	1.472+01	3.040+00	
1500.	1.394+01	2.157-01	1.199+01	1.387+00	3.523-01
2000.	1.238+01	1.216-01	1.023+01	8.379-01	1.186+00
3000.	1.129+01	5.420-02	8.052+00	4.398-01	2.749+00
4000.	1.115+01	3.053-02	6.715+00	2.897-01	4.117+00
5000.	1.134+01	1.955-02	5.798+00	2.137-01	5.309+00
6000.	1.166+01	1.358-02	5.124+00	1.684-01	6.354+00
8000.	1.241+01	7.646-03	4.191+00	1.176-01	8.089+00
10000.	1.313+01	4.895-03	3.568+00	9.003-02	9.468+00
15000.	1.468+01	2.177-03	2.639+00	5.653-02	1.198+01
20000.	1.600+01	1.225-03	2.117+00	4.112-02	1.384+01
30000.	1.825+01	5.444-04	1.539+00	2.658-02	1.668+01
40000.	1.995+01	3.063-04	1.222+00	1.963-02	1.871+01
50000.	2.122+01	1.960-04	1.019+00	1.556-02	2.019+01
60000.	2.221+01	1.361-04	8.777-01	1.288-02	2.132+01
80000.	2.365+01	7.659-05	6.915-01	9.585-03	2.295+01
100000.	2.468+01	4.902-05	5.737-01	7.632-03	2.410+01

Z= 71 LUTETIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	5.462+07	3.353+03	1.983-04	5.462+07
.015	3.641+07	3.353+03	4.455-04	3.641+07
.020	2.731+07	3.353+03	7.906-04	2.731+07
.030	1.821+07	3.353+03	1.773-03	1.821+07
.040	1.366+07	3.353+03	3.141-03	1.365+07
.050	1.093+07	3.353+03	4.890-03	1.092+07
.060	9.106+06	3.353+03	7.017-03	9.103+06
.080	6.830+06	3.352+03	1.239-02	6.827+06
.100	5.465+06	3.351+03	1.922-02	5.462+06
.150	3.644+06	3.349+03	4.248-02	3.641+06
.200	1.402+07	3.345+03	7.416-02	1.401+07
.300	7.894+06	3.336+03	1.607-01	7.891+06
.400	5.006+06	3.324+03	2.749-01	5.003+06
.500	3.425+06	3.308+03	4.126-01	3.422+06
.600	2.475+06	3.291+03	5.697-01	2.472+06
.800	1.446+06	3.249+03	9.261-01	1.443+06
1.000	9.353+05	3.202+03	1.312+00	9.321+05
1.500	4.059+05	3.070+03	2.276+00	4.028+05
2.000	9.982+05	2.926+03	3.218+00	9.953+05
3.000	4.903+05	2.631+03	5.022+00	4.877+05
4.000	2.451+05	2.351+03	6.701+00	2.427+05
5.000	1.415+05	2.096+03	8.255+00	1.394+05
6.000	8.993+04	1.871+03	9.694+00	8.805+04
8.000	4.374+04	1.505+03	1.225+01	4.222+04
10.000	6.444+04	1.228+03	1.444+01	6.320+04
15.000	3.613+04	7.996+02	1.869+01	3.531+04
20.000	1.712+04	5.605+02	2.182+01	1.653+04
30.000	5.834+03	3.305+02	2.592+01	5.477+03
40.000	2.716+03	2.137+02	2.825+01	2.474+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.513+03	1.485+02	2.951+01	1.335+03	
60.	9.469+02	1.088+02	3.016+01	8.080+02	
80.	2.078+03	6.540+01	3.035+01	1.982+03	
100.	1.167+03	4.353+01	3.040+01	1.093+03	
150.	4.120+02	2.037+01	2.903+01	3.626+02	
200.	2.043+02	1.176+01	2.729+01	1.653+02	
300.	8.527+01	5.359+00	2.432+01	5.559+01	
400.	5.150+01	3.052+00	2.204+01	2.641+01	
500.	3.743+01	1.968+00	2.025+01	1.522+01	
600.	3.006+01	1.374+00	1.880+01	9.886+00	
800.	2.254+01	7.776-01	1.657+01	5.184+00	
1000.	1.867+01	4.995-01	1.493+01	3.239+00	
1500.	1.422+01	2.231-01	1.216+01	1.477+00	3.636-01
2000.	1.263+01	1.258-01	1.038+01	8.912-01	1.233+00
3000.	1.153+01	5.606-02	8.167+00	4.672-01	2.838+00
4000.	1.138+01	3.157-02	6.811+00	3.077-01	4.228+00
5000.	1.156+01	2.022-02	5.881+00	2.269-01	5.436+00
6000.	1.189+01	1.405-02	5.198+00	1.788-01	6.495+00
8000.	1.265+01	7.908-03	4.251+00	1.248-01	8.268+00
10000.	1.342+01	5.063-03	3.619+00	9.554-02	9.697+00
15000.	1.510+01	2.251-03	2.677+00	5.999-02	1.236+01
20000.	1.651+01	1.267-03	2.147+00	4.364-02	1.432+01
30000.	1.877+01	5.631-04	1.561+00	2.821-02	1.718+01
40000.	2.043+01	3.168-04	1.240+00	2.083-02	1.917+01
50000.	2.169+01	2.027-04	1.034+00	1.651-02	2.064+01
60000.	2.268+01	1.408-04	8.903-01	1.367-02	2.178+01
80000.	2.419+01	7.921-05	7.014-01	1.017-02	2.348+01
100000.	2.531+01	5.069-05	5.819-01	8.101-03	2.472+01

Z= 72 HAFNIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	5.661+07	3.448+03	2.022-04	5.660+07
.015	3.774+07	3.448+03	4.542-04	3.774+07
.020	2.831+07	3.448+03	8.061-04	2.830+07
.030	1.887+07	3.448+03	1.807-03	1.887+07
.040	1.415+07	3.448+03	3.202-03	1.415+07
.050	1.132+07	3.448+03	4.986-03	1.132+07
.060	9.438+06	3.448+03	7.154-03	9.434+06
.080	7.079+06	3.447+03	1.263-02	7.076+06
.100	5.664+06	3.446+03	1.959-02	5.660+06
.150	3.777+06	3.444+03	4.330-02	3.774+06
.200	2.834+06	3.441+03	7.558-02	2.830+06
.300	8.633+06	3.431+03	1.638-01	8.630+06
.400	5.598+06	3.419+03	2.800-01	5.594+06
.500	3.822+06	3.404+03	4.200-01	3.818+06
.600	2.744+06	3.386+03	5.797-01	2.741+06
.800	1.584+06	3.344+03	9.415-01	1.581+06
1.000	1.015+06	3.296+03	1.332+00	1.012+06
1.500	4.345+05	3.160+03	2.303+00	4.313+05
2.000	1.060+06	3.010+03	3.247+00	1.057+06
3.000	5.158+05	2.704+03	5.048+00	5.131+05
4.000	2.566+05	2.417+03	6.731+00	2.542+05
5.000	1.492+05	2.158+03	8.300+00	1.470+05
6.000	9.547+04	1.929+03	9.757+00	9.353+04
8.000	4.650+04	1.555+03	1.236+01	4.494+04
10.000	6.844+04	1.270+03	1.457+01	6.715+04
15.000	3.792+04	8.211+02	1.884+01	3.708+04
20.000	1.786+04	5.804+02	2.199+01	1.725+04
30.000	6.115+03	3.420+02	2.615+01	5.747+03
40.000	2.864+03	2.211+02	2.854+01	2.614+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.598+03	1.536+02	2.982+01	1.415+03	
60.	9.968+02	1.125+02	3.049+01	8.538+02	
80.	2.174+03	6.763+01	3.071+01	2.076+03	
100.	1.226+03	4.501+01	3.078+01	1.150+03	
150.	4.344+02	2.106+01	2.940+01	3.840+02	
200.	2.153+02	1.215+01	2.764+01	1.755+02	
300.	8.938+01	5.540+00	2.465+01	5.920+01	
400.	5.359+01	3.155+00	2.234+01	2.810+01	
500.	3.870+01	2.035+00	2.052+01	1.614+01	
600.	3.094+01	1.420+00	1.905+01	1.046+01	
800.	2.309+01	8.038-01	1.680+01	5.481+00	
1000.	1.908+01	5.164-01	1.514+01	3.428+00	
1500.	1.451+01	2.306-01	1.233+01	1.567+00	3.815-01
2000.	1.283+01	1.301-01	1.053+01	9.475-01	1.230+00
3000.	1.175+01	5.795-02	8.281+00	4.976-01	2.909+00
4000.	1.168+01	3.263-02	6.907+00	3.278-01	4.410+00
5000.	1.194+01	2.090-02	5.964+00	2.417-01	5.715+00
6000.	1.232+01	1.452-02	5.271+00	1.904-01	6.840+00
8000.	1.310+01	8.174-03	4.311+00	1.329-01	8.648+00
10000.	1.380+01	5.233-03	3.670+00	1.017-01	1.002+01
15000.	1.527+01	2.327-03	2.714+00	6.379-02	1.249+01
20000.	1.671+01	1.309-03	2.177+00	4.638-02	1.449+01
30000.	1.928+01	5.820-04	1.583+00	2.997-02	1.767+01
40000.	2.106+01	3.274-04	1.257+00	2.212-02	1.978+01
50000.	2.228+01	2.096-04	1.049+00	1.753-02	2.121+01
60000.	2.321+01	1.455-04	9.028-01	1.451-02	2.229+01
80000.	2.467+01	8.188-05	7.113-01	1.080-02	2.395+01
100000.	2.595+01	5.240-05	5.901-01	8.597-03	2.535+01

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 73 TANTALUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	5.830+07	3.545+03	1.984-04	5.829+07
.015	3.887+07	3.545+03	4.456-04	3.886+07
.020	2.915+07	3.545+03	7.908-04	2.915+07
.030	1.943+07	3.545+03	1.773-03	1.943+07
.040	1.458+07	3.545+03	3.141-03	1.457+07
.050	1.166+07	3.544+03	4.891-03	1.166+07
.060	9.719+06	3.544+03	7.019-03	9.715+06
.080	7.290+06	3.544+03	1.239-02	7.287+06
.100	5.833+06	3.543+03	1.923-02	5.829+06
.150	3.890+06	3.540+03	4.250-02	3.886+06
.200	2.918+06	3.537+03	7.419-02	2.915+06
.300	8.391+06	3.528+03	1.608-01	8.387+06
.400	5.429+06	3.516+03	2.751-01	5.425+06
.500	3.759+06	3.501+03	4.129-01	3.755+06
.600	2.738+06	3.483+03	5.703-01	2.734+06
.800	1.617+06	3.441+03	9.274-01	1.614+06
1.000	1.054+06	3.392+03	1.314+00	1.051+06
1.500	4.639+05	3.253+03	2.284+00	4.607+05
2.000	1.126+06	3.097+03	3.234+00	1.123+06
3.000	5.465+05	2.779+03	5.059+00	5.438+05
4.000	2.740+05	2.484+03	6.764+00	2.715+05
5.000	1.578+05	2.219+03	8.349+00	1.556+05
6.000	1.001+05	1.986+03	9.819+00	9.806+04
8.000	4.863+04	1.604+03	1.244+01	4.701+04
10.000	7.256+04	1.314+03	1.468+01	7.123+04
15.000	3.982+04	8.524+02	1.903+01	3.894+04
20.000	1.900+04	6.012+02	2.223+01	1.838+04
30.000	6.514+03	3.529+02	2.643+01	6.135+03
40.000	3.036+03	2.275+02	2.884+01	2.780+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.689+03	1.577+02	3.016+01	1.501+03	
60.	1.053+03	1.154+02	3.085+01	9.069+02	
80.	2.269+03	6.925+01	3.107+01	2.169+03	
100.	1.283+03	4.604+01	3.116+01	1.205+03	
150.	4.553+02	2.152+01	2.978+01	4.040+02	
200.	2.256+02	1.241+01	2.801+01	1.851+02	
300.	9.328+01	5.653+00	2.498+01	6.264+01	
400.	5.569+01	3.219+00	2.265+01	2.982+01	
500.	4.006+01	2.075+00	2.081+01	1.718+01	
600.	3.193+01	1.448+00	1.932+01	1.116+01	
800.	2.371+01	8.195-01	1.704+01	5.852+00	
1000.	1.953+01	5.264-01	1.535+01	3.658+00	
1500.	1.479+01	2.351-01	1.250+01	1.669+00	3.919-01
2000.	1.311+01	1.326-01	1.067+01	1.008+00	1.300+00
3000.	1.198+01	5.906-02	8.396+00	5.282-01	2.999+00
4000.	1.186+01	3.326-02	7.002+00	3.477-01	4.475+00
5000.	1.208+01	2.130-02	6.046+00	2.562-01	5.753+00
6000.	1.242+01	1.480-02	5.344+00	2.018-01	6.864+00
8000.	1.321+01	8.331-03	4.371+00	1.408-01	8.692+00
10000.	1.397+01	5.334-03	3.721+00	1.077-01	1.014+01
15000.	1.564+01	2.372-03	2.752+00	6.758-02	1.282+01
20000.	1.714+01	1.334-03	2.208+00	4.914-02	1.488+01
30000.	1.968+01	5.932-04	1.605+00	3.175-02	1.805+01
40000.	2.152+01	3.337-04	1.275+00	2.343-02	2.023+01
50000.	2.287+01	2.136-04	1.063+00	1.857-02	2.179+01
60000.	2.391+01	1.483-04	9.153-01	1.538-02	2.298+01
80000.	2.547+01	8.344-05	7.212-01	1.144-02	2.474+01
100000.	2.666+01	5.340-05	5.983-01	9.108-03	2.606+01

Z= 74 TUNGSTEN

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.045+07	3.643+03	2.035-04	6.044+07
.015	4.030+07	3.643+03	4.571-04	4.030+07
.020	3.023+07	3.643+03	8.112-04	3.022+07
.030	2.015+07	3.642+03	1.819-03	2.015+07
.040	1.511+07	3.642+03	3.222-03	1.511+07
.050	1.209+07	3.642+03	5.017-03	1.209+07
.060	1.008+07	3.642+03	7.199-03	1.007+07
.080	7.559+06	3.641+03	1.271-02	7.555+06
.100	6.048+06	3.641+03	1.971-02	6.044+06
.150	4.033+06	3.638+03	4.356-02	4.030+06
.200	3.026+06	3.635+03	7.602-02	3.022+06
.300	8.658+06	3.626+03	1.647-01	8.654+06
.400	5.669+06	3.614+03	2.814-01	5.666+06
.500	3.952+06	3.599+03	4.220-01	3.948+06
.600	2.890+06	3.582+03	5.822-01	2.887+06
.800	1.716+06	3.540+03	9.447-01	1.712+06
1.000	1.122+06	3.491+03	1.335+00	1.118+06
1.500	4.958+05	3.348+03	2.301+00	4.924+05
2.000	1.189+06	3.187+03	3.235+00	1.186+06
3.000	5.766+05	2.857+03	5.020+00	5.738+05
4.000	2.888+05	2.554+03	6.713+00	2.862+05
5.000	1.665+05	2.283+03	8.315+00	1.642+05
6.000	1.056+05	2.044+03	9.821+00	1.036+05
8.000	5.122+04	1.654+03	1.253+01	4.955+04
10.000	2.908+04	1.357+03	1.481+01	2.771+04
15.000	4.189+04	8.814+02	1.915+01	4.099+04
20.000	1.985+04	6.218+02	2.235+01	1.920+04
30.000	6.831+03	3.660+02	2.663+01	6.439+03
40.000	3.205+03	2.364+02	2.911+01	2.940+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.789+03	1.641+02	3.046+01	1.594+03	
60.	1.115+03	1.202+02	3.118+01	9.638+02	
80.	2.378+03	7.222+01	3.143+01	2.274+03	
100.	1.347+03	4.805+01	3.154+01	1.267+03	
150.	4.786+02	2.248+01	3.016+01	4.260+02	
200.	2.369+02	1.297+01	2.837+01	1.955+02	
300.	9.747+01	5.909+00	2.531+01	6.625+01	
400.	5.786+01	3.366+00	2.295+01	3.155+01	
500.	4.143+01	2.170+00	2.109+01	1.817+01	
600.	3.289+01	1.515+00	1.958+01	1.180+01	
800.	2.432+01	8.572-01	1.727+01	6.192+00	
1000.	1.998+01	5.507-01	1.556+01	3.874+00	
1500.	1.509+01	2.460-01	1.267+01	1.771+00	4.087-01
2000.	1.338+01	1.387-01	1.082+01	1.070+00	1.354+00
3000.	1.225+01	6.179-02	8.511+00	5.610-01	3.118+00
4000.	1.215+01	3.480-02	7.098+00	3.692-01	4.643+00
5000.	1.238+01	2.229-02	6.129+00	2.721-01	5.956+00
6000.	1.274+01	1.549-02	5.417+00	2.143-01	7.092+00
8000.	1.354+01	8.716-03	4.431+00	1.494-01	8.956+00
10000.	1.432+01	5.581-03	3.772+00	1.143-01	1.043+01
15000.	1.606+01	2.481-03	2.790+00	7.167-02	1.319+01
20000.	1.765+01	1.396-03	2.238+00	5.209-02	1.536+01
30000.	2.028+01	6.207-04	1.627+00	3.365-02	1.861+01
40000.	2.211+01	3.492-04	1.292+00	2.483-02	2.079+01
50000.	2.343+01	2.235-04	1.078+00	1.968-02	2.233+01
60000.	2.445+01	1.552-04	9.279-01	1.629-02	2.350+01
80000.	2.601+01	8.731-05	7.310-01	1.212-02	2.527+01
100000.	2.725+01	5.588-05	6.065-01	9.648-03	2.664+01

Z= 75 RHENIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.215+07	3.742+03	2.054-04	6.214+07
.015	4.143+07	3.742+03	4.614-04	4.143+07
.020	3.108+07	3.742+03	8.189-04	3.107+07
.030	2.072+07	3.742+03	1.836-03	2.071+07
.040	1.554+07	3.741+03	3.252-03	1.554+07
.050	1.243+07	3.741+03	5.064-03	1.243+07
.060	1.036+07	3.741+03	7.266-03	1.036+07
.080	7.772+06	3.741+03	1.282-02	7.768+06
.100	6.218+06	3.740+03	1.989-02	6.214+06
.150	4.147+06	3.738+03	4.395-02	4.143+06
.200	3.111+06	3.734+03	7.668-02	3.107+06
.300	8.829+06	3.726+03	1.660-01	8.825+06
.400	5.757+06	3.714+03	2.836-01	5.753+06
.500	4.036+06	3.699+03	4.252-01	4.032+06
.600	2.971+06	3.682+03	5.863-01	2.967+06
.800	1.783+06	3.640+03	9.503-01	1.779+06
1.000	1.174+06	3.591+03	1.341+00	1.171+06
1.500	5.259+05	3.445+03	2.302+00	5.224+05
2.000	1.238+06	3.279+03	3.226+00	1.235+06
3.000	6.063+05	2.938+03	4.989+00	6.034+05
4.000	3.042+05	2.625+03	6.679+00	3.015+05
5.000	1.753+05	2.347+03	8.296+00	1.729+05
6.000	1.112+05	2.102+03	9.829+00	1.090+05
8.000	5.395+04	1.704+03	1.260+01	5.223+04
10.000	3.074+04	1.401+03	1.493+01	2.932+04
15.000	4.405+04	9.127+02	1.930+01	4.312+04
20.000	2.106+04	6.431+02	2.253+01	2.039+04
30.000	7.247+03	3.783+02	2.686+01	6.841+03
40.000	3.385+03	2.442+02	2.938+01	3.112+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.883+03	1.695+02	3.076+01	1.683+03	
60.	1.173+03	1.241+02	3.151+01	1.018+03	
80.	2.482+03	7.456+01	3.178+01	2.375+03	
100.	1.409+03	4.960+01	3.191+01	1.328+03	
150.	5.025+02	2.320+01	3.053+01	4.488+02	
200.	2.487+02	1.338+01	2.873+01	2.066+02	
300.	1.020+02	6.099+00	2.564+01	7.025+01	
400.	6.020+01	3.473+00	2.325+01	3.348+01	
500.	4.287+01	2.240+00	2.137+01	1.926+01	
600.	3.390+01	1.563+00	1.984+01	1.250+01	
800.	2.494+01	8.846-01	1.750+01	6.561+00	
1000.	2.044+01	5.682-01	1.577+01	4.111+00	
1500.	1.540+01	2.538-01	1.284+01	1.884+00	4.211-01
2000.	1.365+01	1.431-01	1.096+01	1.140+00	1.403+00
3000.	1.249+01	6.376-02	8.626+00	5.983-01	3.205+00
4000.	1.237+01	3.591-02	7.194+00	3.937-01	4.746+00
5000.	1.259+01	2.300-02	6.212+00	2.900-01	6.069+00
6000.	1.295+01	1.598-02	5.490+00	2.282-01	7.217+00
8000.	1.378+01	8.994-03	4.491+00	1.590-01	9.118+00
10000.	1.460+01	5.758-03	3.823+00	1.215-01	1.065+01
15000.	1.649+01	2.560-03	2.828+00	7.611-02	1.359+01
20000.	1.819+01	1.441-03	2.268+00	5.528-02	1.586+01
30000.	2.085+01	6.404-04	1.649+00	3.567-02	1.916+01
40000.	2.268+01	3.603-04	1.309+00	2.632-02	2.134+01
50000.	2.401+01	2.306-04	1.092+00	2.085-02	2.290+01
60000.	2.506+01	1.601-04	9.404-01	1.726-02	2.410+01
80000.	2.668+01	9.009-05	7.409-01	1.283-02	2.593+01
100000.	2.797+01	5.766-05	6.147-01	1.022-02	2.735+01

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 76 OSMIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.474+07	3.842+03	2.067-04	6.474+07
.015	4.316+07	3.842+03	4.643-04	4.316+07
.020	3.237+07	3.842+03	8.239-04	3.237+07
.030	2.158+07	3.842+03	1.847-03	2.158+07
.040	1.619+07	3.842+03	3.272-03	1.618+07
.050	1.295+07	3.842+03	5.095-03	1.295+07
.060	1.079+07	3.842+03	7.310-03	1.079+07
.080	8.096+06	3.841+03	1.290-02	8.092+06
.100	6.478+06	3.840+03	2.001-02	6.474+06
.150	4.320+06	3.838+03	4.421-02	4.316+06
.200	3.241+06	3.835+03	7.714-02	3.237+06
.300	8.970+06	3.826+03	1.670-01	8.966+06
.400	5.937+06	3.815+03	2.853-01	5.933+06
.500	4.194+06	3.800+03	4.275-01	4.190+06
.600	3.102+06	3.783+03	5.895-01	3.098+06
.800	1.872+06	3.741+03	9.551-01	1.869+06
1.000	1.239+06	3.692+03	1.347+00	1.235+06
1.500	5.593+05	3.543+03	2.310+00	5.558+05
2.000	8.847+05	3.372+03	3.233+00	8.814+05
3.000	6.106+05	3.021+03	4.996+00	6.076+05
4.000	3.199+05	2.699+03	6.695+00	3.172+05
5.000	1.847+05	2.413+03	8.330+00	1.823+05
6.000	1.173+05	2.162+03	9.885+00	1.151+05
8.000	5.699+04	1.754+03	1.270+01	5.522+04
10.000	3.246+04	1.444+03	1.506+01	3.100+04
15.000	4.629+04	9.432+02	1.947+01	4.533+04
20.000	2.206+04	6.648+02	2.272+01	2.137+04
30.000	7.615+03	3.908+02	2.712+01	7.197+03
40.000	3.573+03	2.522+02	2.969+01	3.291+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	1.993+03	1.750+02	3.110+01	1.787+03	
60.	1.243+03	1.281+02	3.185+01	1.083+03	
80.	2.590+03	7.694+01	3.213+01	2.481+03	
100.	1.477+03	5.118+01	3.229+01	1.393+03	
150.	5.276+02	2.393+01	3.091+01	4.728+02	
200.	2.608+02	1.380+01	2.909+01	2.179+02	
300.	1.064+02	6.290+00	2.597+01	7.416+01	
400.	6.253+01	3.582+00	2.355+01	3.540+01	
500.	4.438+01	2.310+00	2.164+01	2.042+01	
600.	3.499+01	1.612+00	2.010+01	1.328+01	
800.	2.562+01	9.122-01	1.773+01	6.981+00	
1000.	2.093+01	5.860-01	1.597+01	4.374+00	
1500.	1.571+01	2.617-01	1.301+01	2.002+00	4.379-01
2000.	1.391+01	1.476-01	1.111+01	1.210+00	1.446+00
3000.	1.274+01	6.575-02	8.741+00	6.340-01	3.302+00
4000.	1.263+01	3.703-02	7.290+00	4.169-01	4.891+00
5000.	1.288+01	2.372-02	6.295+00	3.069-01	6.252+00
6000.	1.325+01	1.648-02	5.564+00	2.414-01	7.428+00
8000.	1.409+01	9.274-03	4.550+00	1.682-01	9.361+00
10000.	1.491+01	5.938-03	3.874+00	1.285-01	1.090+01
15000.	1.676+01	2.640-03	2.865+00	8.046-02	1.381+01
20000.	1.843+01	1.486-03	2.298+00	5.844-02	1.608+01
30000.	2.111+01	6.604-04	1.671+00	3.771-02	1.940+01
40000.	2.296+01	3.715-04	1.327+00	2.782-02	2.160+01
50000.	2.430+01	2.378-04	1.107+00	2.204-02	2.317+01
60000.	2.535+01	1.651-04	9.530-01	1.824-02	2.438+01
80000.	2.700+01	9.290-05	7.508-01	1.357-02	2.623+01
100000.	2.832+01	5.946-05	6.229-01	1.080-02	2.769+01

Z= 77 IRIDIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.703+07	3.944+03	2.080-04	6.702+07
.015	4.469+07	3.944+03	4.671-04	4.468+07
.020	3.352+07	3.944+03	8.289-04	3.351+07
.030	2.234+07	3.944+03	1.858-03	2.234+07
.040	1.676+07	3.944+03	3.292-03	1.676+07
.050	1.341+07	3.944+03	5.125-03	1.340+07
.060	1.117+07	3.943+03	7.354-03	1.117+07
.080	8.382+06	3.943+03	1.298-02	8.378+06
.100	6.706+06	3.942+03	2.013-02	6.702+06
.150	4.472+06	3.940+03	4.447-02	4.468+06
.200	3.355+06	3.937+03	7.759-02	3.351+06
.300	9.469+06	3.928+03	1.680-01	9.465+06
.400	6.286+06	3.917+03	2.868-01	6.282+06
.500	4.453+06	3.902+03	4.298-01	4.449+06
.600	3.299+06	3.885+03	5.926-01	3.295+06
.800	1.995+06	3.844+03	9.597-01	1.991+06
1.000	1.321+06	3.794+03	1.353+00	1.317+06
1.500	5.955+05	3.644+03	2.316+00	5.919+05
2.000	3.261+05	3.469+03	3.238+00	3.227+05
3.000	6.434+05	3.108+03	4.999+00	6.403+05
4.000	3.377+05	2.776+03	6.707+00	3.349+05
5.000	1.951+05	2.480+03	8.360+00	1.926+05
6.000	1.236+05	2.222+03	9.940+00	1.213+05
8.000	5.982+04	1.805+03	1.280+01	5.800+04
10.000	3.412+04	1.489+03	1.520+01	3.262+04
15.000	4.818+04	9.741+02	1.964+01	4.718+04
20.000	2.322+04	6.869+02	2.291+01	2.251+04
30.000	8.083+03	4.035+02	2.735+01	7.652+03
40.000	3.804+03	2.603+02	2.995+01	3.513+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.124+03	1.806+02	3.140+01	1.912+03	
60.	1.324+03	1.322+02	3.218+01	1.160+03	
80.	2.699+03	7.935+01	3.249+01	2.587+03	
100.	1.542+03	5.278+01	3.266+01	1.457+03	
150.	5.518+02	2.467+01	3.129+01	4.958+02	
200.	2.726+02	1.423+01	2.945+01	2.290+02	
300.	1.109+02	6.484+00	2.630+01	7.813+01	
400.	6.494+01	3.692+00	2.386+01	3.739+01	
500.	4.593+01	2.381+00	2.193+01	2.162+01	
600.	3.610+01	1.661+00	2.036+01	1.408+01	
800.	2.631+01	9.403-01	1.796+01	7.411+00	
1000.	2.143+01	6.040-01	1.618+01	4.643+00	
1500.	1.603+01	2.697-01	1.318+01	2.123+00	4.587-01
2000.	1.415+01	1.521-01	1.126+01	1.282+00	1.460+00
3000.	1.298+01	6.777-02	8.856+00	6.710-01	3.383+00
4000.	1.293+01	3.817-02	7.386+00	4.409-01	5.069+00
5000.	1.325+01	2.444-02	6.378+00	3.245-01	6.519+00
6000.	1.367+01	1.698-02	5.637+00	2.553-01	7.764+00
8000.	1.456+01	9.559-03	4.610+00	1.777-01	9.760+00
10000.	1.535+01	6.120-03	3.925+00	1.358-01	1.128+01
15000.	1.704+01	2.721-03	2.903+00	8.504-02	1.405+01
20000.	1.869+01	1.531-03	2.329+00	6.177-02	1.630+01
30000.	2.164+01	6.806-04	1.693+00	3.986-02	1.990+01
40000.	2.368+01	3.829-04	1.344+00	2.941-02	2.231+01
50000.	2.510+01	2.451-04	1.121+00	2.329-02	2.395+01
60000.	2.616+01	1.702-04	9.655-01	1.928-02	2.518+01
80000.	2.780+01	9.575-05	7.607-01	1.434-02	2.702+01
100000.	2.916+01	6.128-05	6.311-01	1.142-02	2.852+01

Z= 78 PLATINUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	6.965+07	4.047+03	1.876-04	6.965+07
.015	4.644+07	4.047+03	4.214-04	4.643+07
.020	3.483+07	4.047+03	7.478-04	3.482+07
.030	2.322+07	4.047+03	1.677-03	2.322+07
.040	1.742+07	4.047+03	2.971-03	1.741+07
.050	1.393+07	4.047+03	4.625-03	1.393+07
.060	1.161+07	4.046+03	6.637-03	1.161+07
.080	8.710+06	4.046+03	1.172-02	8.706+06
.100	6.969+06	4.045+03	1.818-02	6.965+06
.150	4.647+06	4.043+03	4.018-02	4.643+06
.200	3.486+06	4.041+03	7.013-02	3.482+06
.300	2.326+06	4.033+03	1.520-01	2.322+06
.400	6.618+06	4.022+03	2.599-01	6.614+06
.500	4.721+06	4.009+03	3.899-01	4.717+06
.600	3.508+06	3.993+03	5.383-01	3.504+06
.800	2.126+06	3.954+03	8.747-01	2.122+06
1.000	1.407+06	3.907+03	1.238+00	1.403+06
1.500	6.340+05	3.759+03	2.146+00	6.303+05
2.000	3.467+05	3.582+03	3.037+00	3.431+05
3.000	6.368+05	3.211+03	4.788+00	6.336+05
4.000	3.541+05	2.865+03	6.518+00	3.512+05
5.000	2.046+05	2.555+03	8.211+00	2.020+05
6.000	1.299+05	2.287+03	9.841+00	1.276+05
8.000	6.308+04	1.858+03	1.281+01	6.121+04
10.000	3.601+04	1.535+03	1.527+01	3.446+04
15.000	5.036+04	1.007+03	1.978+01	4.933+04
20.000	2.466+04	7.098+02	2.309+01	2.392+04
30.000	8.554+03	4.169+02	2.761+01	8.109+03
40.000	3.985+03	2.688+02	3.026+01	3.685+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	2.210+03	1.864+02	3.173+01	1.991+03	
60.	1.375+03	1.365+02	3.252+01	1.206+03	
80.	2.827+03	8.190+01	3.286+01	2.712+03	
100.	1.614+03	5.446+01	3.304+01	1.527+03	
150.	5.776+02	2.546+01	3.167+01	5.205+02	
200.	2.853+02	1.468+01	2.983+01	2.408+02	
300.	1.157+02	6.689+00	2.664+01	8.239+01	
400.	6.746+01	3.809+00	2.416+01	3.949+01	
500.	4.751+01	2.456+00	2.221+01	2.284+01	
600.	3.722+01	1.714+00	2.063+01	1.488+01	
800.	2.700+01	9.698-01	1.820+01	7.833+00	
1000.	2.193+01	6.230-01	1.639+01	4.909+00	
1500.	1.634+01	2.782-01	1.335+01	2.246+00	4.675-01
2000.	1.447+01	1.569-01	1.140+01	1.356+00	1.559+00
3000.	1.325+01	6.990-02	8.971+00	7.096-01	3.503+00
4000.	1.312+01	3.936-02	7.482+00	4.662-01	5.136+00
5000.	1.336+01	2.521-02	6.461+00	3.430-01	6.531+00
6000.	1.374+01	1.752-02	5.710+00	2.698-01	7.743+00
8000.	1.463+01	9.859-03	4.670+00	1.879-01	9.762+00
10000.	1.552+01	6.312-03	3.976+00	1.435-01	1.140+01
15000.	1.753+01	2.807-03	2.941+00	8.985-02	1.450+01
20000.	1.924+01	1.579-03	2.359+00	6.525-02	1.681+01
30000.	2.196+01	7.020-04	1.715+00	4.210-02	2.020+01
40000.	2.395+01	3.949-04	1.362+00	3.106-02	2.256+01
50000.	2.547+01	2.528-04	1.136+00	2.460-02	2.431+01
60000.	2.667+01	1.755-04	9.780-01	2.036-02	2.567+01
80000.	2.845+01	9.875-05	7.706-01	1.514-02	2.767+01
100000.	2.972+01	6.320-05	6.393-01	1.205-02	2.907+01

TABLE II, CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 79 GOLD

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	7.195+07	4.151+03	1.830-04	7.195+07	
.015	4.797+07	4.151+03	4.111-04	4.797+07	
.020	3.598+07	4.151+03	7.295-04	3.597+07	
.030	2.399+07	4.151+03	1.636-03	2.398+07	
.040	1.799+07	4.151+03	2.898-03	1.799+07	
.050	1.439+07	4.151+03	4.513-03	1.439+07	
.060	1.200+07	4.151+03	6.476-03	1.199+07	
.080	8.998+06	4.150+03	1.143-02	8.994+06	
.100	7.199+06	4.150+03	1.774-02	7.195+06	
.150	4.801+06	4.148+03	3.921-02	4.797+06	
.200	3.602+06	4.145+03	6.847-02	3.597+06	
.300	2.402+06	4.137+03	1.484-01	2.398+06	
.400	7.112+06	4.127+03	2.540-01	7.107+06	
.500	5.028+06	4.113+03	3.813-01	5.024+06	
.600	3.724+06	4.097+03	5.267-01	3.720+06	
.800	2.252+06	4.058+03	8.569-01	2.248+06	
1.000	1.491+06	4.011+03	1.215+00	1.487+06	
1.500	6.730+05	3.862+03	2.116+00	6.691+05	
2.000	3.689+05	3.683+03	3.008+00	3.652+05	
3.000	6.674+05	3.304+03	4.772+00	6.641+05	
4.000	3.720+05	2.948+03	6.516+00	3.690+05	
5.000	2.153+05	2.628+03	8.219+00	2.127+05	
6.000	1.365+05	2.351+03	9.858+00	1.342+05	
8.000	6.619+04	1.911+03	1.285+01	6.426+04	
10.000	3.783+04	1.580+03	1.535+01	3.624+04	
15.000	5.307+04	1.040+03	1.997+01	5.201+04	
20.000	2.568+04	7.330+02	2.336+01	2.493+04	
30.000	8.902+03	4.303+02	2.790+01	8.444+03	
40.000	4.164+03	2.773+02	3.057+01	3.856+03	
50.	2.317+03	1.922+02	3.206+01	2.092+03	
60.	1.443+03	1.406+02	3.288+01	1.269+03	
80.	6.956+02	8.438+01	3.321+01	5.780+02	
100.	1.682+03	5.610+01	3.340+01	1.593+03	
150.	6.054+02	2.621+01	3.204+01	5.472+02	
200.	2.986+02	1.512+01	3.019+01	2.533+02	
300.	1.205+02	6.885+00	2.698+01	8.662+01	
400.	6.994+01	3.920+00	2.447+01	4.154+01	
500.	4.913+01	2.527+00	2.249+01	2.411+01	
600.	3.841+01	1.764+00	2.089+01	1.575+01	
800.	2.774+01	9.981-01	1.843+01	8.317+00	
1000.	2.246+01	6.411-01	1.660+01	5.216+00	
1500.	1.668+01	2.863-01	1.352+01	2.386+00	4.865-01
2000.	1.477+01	1.615-01	1.155+01	1.439+00	1.623+00
3000.	1.353+01	7.193-02	9.086+00	7.522-01	3.615+00
4000.	1.339+01	4.051-02	7.578+00	4.937-01	5.274+00
5000.	1.362+01	2.594-02	6.543+00	3.630-01	6.688+00
6000.	1.401+01	1.803-02	5.783+00	2.854-01	7.919+00
8000.	1.492+01	1.015-02	4.730+00	1.986-01	9.984+00
10000.	1.586+01	6.496-03	4.027+00	1.517-01	1.167+01
15000.	1.798+01	2.888-03	2.978+00	9.491-02	1.491+01
20000.	1.974+01	1.625-03	2.389+00	6.891-02	1.728+01
30000.	2.245+01	7.224-04	1.737+00	4.445-02	2.066+01
40000.	2.444+01	4.064-04	1.379+00	3.278-02	2.302+01
50000.	2.597+01	2.601-04	1.150+00	2.596-02	2.480+01
60000.	2.720+01	1.807-04	9.906-01	2.149-02	2.619+01
80000.	2.902+01	1.016-04	7.804-01	1.598-02	2.823+01
100000.	3.029+01	6.504-05	6.475-01	1.272-02	2.963+01

Z= 80 MERCURY

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	7.495+07	4.257+03	2.111-04	7.494+07	
.015	4.997+07	4.257+03	4.741-04	4.996+07	
.020	3.748+07	4.257+03	8.413-04	3.747+07	
.030	2.499+07	4.257+03	1.886-03	2.498+07	
.040	1.874+07	4.257+03	3.341-03	1.874+07	
.050	1.499+07	4.257+03	5.201-03	1.499+07	
.060	1.249+07	4.257+03	7.462-03	1.249+07	
.080	9.372+06	4.256+03	1.317-02	9.368+06	
.100	7.499+06	4.256+03	2.042-02	7.494+06	
.150	5.001+06	4.253+03	4.509-02	4.996+06	
.200	3.751+06	4.251+03	7.865-02	3.747+06	
.300	2.502+06	4.242+03	1.701-01	2.498+06	
.400	7.437+06	4.231+03	2.903-01	7.432+06	
.500	5.306+06	4.217+03	4.345-01	5.302+06	
.600	3.949+06	4.200+03	5.984-01	3.945+06	
.800	2.399+06	4.159+03	9.669-01	2.395+06	
1.000	1.591+06	4.110+03	1.359+00	1.587+06	
1.500	7.174+05	3.955+03	2.307+00	7.134+05	
2.000	3.916+05	3.771+03	3.200+00	3.878+05	
3.000	7.017+05	3.383+03	4.907+00	6.983+05	
4.000	3.905+05	3.020+03	6.608+00	3.874+05	
5.000	2.266+05	2.694+03	8.302+00	2.239+05	
6.000	1.437+05	2.412+03	9.953+00	1.413+05	
8.000	6.954+04	1.963+03	1.299+01	6.757+04	
10.000	3.968+04	1.625+03	1.552+01	3.804+04	
15.000	5.536+04	1.072+03	2.013+01	5.427+04	
20.000	2.711+04	7.563+02	2.351+01	2.633+04	
30.000	9.444+03	4.436+02	2.812+01	8.972+03	
40.000	4.412+03	2.856+02	3.084+01	4.096+03	
50.	2.449+03	1.979+02	3.237+01	2.219+03	
60.	1.521+03	1.447+02	3.320+01	1.344+03	
80.	7.308+02	8.679+01	3.355+01	6.104+02	
100.	1.744+03	5.769+01	3.378+01	1.653+03	
150.	6.290+02	2.695+01	3.241+01	5.696+02	
200.	3.110+02	1.553+01	3.054+01	2.649+02	
300.	1.256+02	7.074+00	2.730+01	9.123+01	
400.	7.273+01	4.028+00	2.477+01	4.393+01	
500.	5.089+01	2.597+00	2.277+01	2.552+01	
600.	3.963+01	1.812+00	2.115+01	1.667+01	
800.	2.849+01	1.025+00	1.866+01	8.810+00	
1000.	2.300+01	6.586-01	1.681+01	5.530+00	
1500.	1.703+01	2.941-01	1.369+01	2.533+00	5.061-01
2000.	1.506+01	1.658-01	1.169+01	1.528+00	1.671+00
3000.	1.379+01	7.388-02	9.201+00	7.986-01	3.712+00
4000.	1.365+01	4.161-02	7.674+00	5.239-01	5.411+00
5000.	1.390+01	2.665-02	6.626+00	3.850-01	6.862+00
6000.	1.430+01	1.851-02	5.856+00	3.025-01	8.127+00
8000.	1.527+01	1.042-02	4.790+00	2.103-01	1.025+01
10000.	1.625+01	6.671-03	4.078+00	1.605-01	1.200+01
15000.	1.846+01	2.966-03	3.016+00	1.003-01	1.534+01
20000.	2.027+01	1.669-03	2.419+00	7.282-02	1.778+01
30000.	2.303+01	7.420-04	1.759+00	4.694-02	2.123+01
40000.	2.507+01	4.174-04	1.397+00	3.461-02	2.364+01
50000.	2.665+01	2.672-04	1.165+00	2.741-02	2.545+01
60000.	2.790+01	1.855-04	1.003+00	2.268-02	2.687+01
80000.	2.973+01	1.044-04	7.903-01	1.686-02	2.892+01
100000.	3.097+01	6.680-05	6.557-01	1.342-02	3.030+01

Z= 81 THALLIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	7.840+07	4.364+03	2.269-04	7.840+07	
.015	5.227+07	4.364+03	5.095-04	5.226+07	
.020	3.920+07	4.364+03	9.042-04	3.920+07	
.030	2.614+07	4.364+03	2.027-03	2.613+07	
.040	1.960+07	4.364+03	3.590-03	1.960+07	
.050	1.568+07	4.364+03	5.589-03	1.568+07	
.060	1.307+07	4.364+03	8.018-03	1.307+07	
.080	9.804+06	4.363+03	1.415-02	9.800+06	
.100	7.844+06	4.362+03	2.194-02	7.840+06	
.150	5.231+06	4.360+03	4.842-02	5.226+06	
.200	3.924+06	4.357+03	8.442-02	3.920+06	
.300	2.618+06	4.347+03	1.825-01	2.613+06	
.400	7.937+06	4.335+03	3.111-01	7.933+06	
.500	5.530+06	4.319+03	4.653-01	5.526+06	
.600	4.102+06	4.301+03	6.401-01	4.098+06	
.800	2.507+06	4.256+03	1.032+00	2.503+06	
1.000	1.674+06	4.202+03	1.447+00	1.670+06	
1.500	7.616+05	4.040+03	2.434+00	7.575+05	
2.000	4.160+05	3.851+03	3.346+00	4.122+05	
3.000	7.362+05	3.457+03	5.058+00	7.327+05	
4.000	4.076+05	3.089+03	6.758+00	4.045+05	
5.000	2.380+05	2.759+03	8.453+00	2.353+05	
6.000	1.513+05	2.472+03	1.011+01	1.488+05	
8.000	7.335+04	2.014+03	1.315+01	7.132+04	
10.000	4.189+04	1.669+03	1.569+01	4.021+04	
15.000	5.084+04	1.107+03	2.032+01	4.971+04	
20.000	2.824+04	7.802+02	2.373+01	2.743+04	
30.000	9.859+03	4.569+02	2.837+01	9.374+03	
40.000	4.629+03	2.940+02	3.113+01	4.304+03	
50.	2.579+03	2.036+02	3.268+01	2.342+03	
60.	1.605+03	1.489+02	3.355+01	1.423+03	
80.	7.699+02	8.923+01	3.392+01	6.467+02	
100.	1.818+03	5.930+01	3.416+01	1.725+03	
150.	6.589+02	2.769+01	3.280+01	5.985+02	
200.	3.258+02	1.596+01	3.091+01	2.789+02	
300.	1.310+02	7.267+00	2.763+01	9.614+01	
400.	7.553+01	4.137+00	2.508+01	4.632+01	
500.	5.264+01	2.667+00	2.305+01	2.692+01	
600.	4.087+01	1.861+00	2.141+01	1.760+01	
800.	2.925+01	1.053+00	1.889+01	9.301+00	
1000.	2.353+01	6.764-01	1.702+01	5.837+00	
1500.	1.736+01	3.021-01	1.387+01	2.670+00	5.213-01
2000.	1.535+01	1.703-01	1.184+01	1.610+00	1.725+00
3000.	1.405+01	7.588-02	9.316+00	8.410-01	3.818+00
4000.	1.391+01	4.273-02	7.770+00	5.516-01	5.547+00
5000.	1.416+01	2.737-02	6.709+00	4.053-01	7.015+00
6000.	1.456+01	1.901-02	5.930+00	3.185-01	8.291+00
8000.	1.552+01	1.070-02	4.850+00	2.215-01	1.043+01
10000.	1.651+01	6.852-03	4.129+00	1.691-01	1.220+01
15000.	1.880+01	3.047-03	3.054+00	1.057-01	1.564+01
20000.	2.073+01	1.714-03	2.450+00	7.671-02	1.821+01
30000.	2.366+01	7.620-04	1.781+00	4.946-02	2.183+01
40000.	2.577+01	4.287-04	1.414+00	3.647-02	2.431+01
50000.	2.739+01	2.744-04	1.180+00	2.888-02	2.618+01
60000.	2.868+01	1.906-04	1.016+00	2.390-02	2.764+01
80000.	3.062+01	1.072-04	8.002-01	1.777-02	2.981+01
100000.	3.199+01	6.861-05	6.639-01	1.414-02	3.131+01

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 82 LEAD

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	8.188+07	4.473+03	2.290-04	8.187+07	
.015	5.459+07	4.473+03	5.143-04	5.458+07	
.020	4.094+07	4.473+03	9.126-04	4.094+07	
.030	2.730+07	4.473+03	2.046-03	2.729+07	
.040	2.047+07	4.472+03	3.624-03	2.047+07	
.050	1.638+07	4.472+03	5.641-03	1.637+07	
.060	1.365+07	4.472+03	8.093-03	1.365+07	
.080	1.024+07	4.471+03	1.428-02	1.023+07	
.100	8.192+06	4.471+03	2.215-02	8.187+06	
.150	5.463+06	4.468+03	4.890-02	5.458+06	
.200	4.098+06	4.465+03	8.527-02	4.094+06	
.300	2.734+06	4.455+03	1.844-01	2.729+06	
.400	2.051+06	4.441+03	3.145-01	2.047+06	
.500	5.645+06	4.425+03	4.707-01	5.640+06	
.600	4.301+06	4.405+03	6.480-01	4.296+06	
.800	2.656+06	4.358+03	1.046+00	2.652+06	
1.000	1.770+06	4.302+03	1.469+00	1.766+06	
1.500	8.016+05	4.132+03	2.484+00	7.974+05	
2.000	4.392+05	3.937+03	3.432+00	4.352+05	
3.000	6.671+05	3.532+03	5.213+00	6.636+05	
4.000	4.271+05	3.157+03	6.952+00	4.239+05	
5.000	2.481+05	2.823+03	8.657+00	2.453+05	
6.000	1.580+05	2.532+03	1.030+01	1.555+05	
8.000	7.705+04	2.066+03	1.332+01	7.497+04	
10.000	4.410+04	1.713+03	1.585+01	4.237+04	
15.000	3.840+04	1.136+03	2.056+01	3.725+04	
20.000	2.952+04	8.044+02	2.402+01	2.869+04	
30.000	1.034+04	4.700+02	2.868+01	9.838+03	
40.000	4.855+03	3.019+02	3.145+01	4.522+03	
50.	2.705+03	2.088+02	3.302+01	2.463+03	
60.	1.684+03	1.526+02	3.390+01	1.498+03	
80.	8.080+02	9.136+01	3.426+01	6.824+02	
100.	1.893+03	6.067+01	3.451+01	1.798+03	
150.	6.872+02	2.831+01	3.316+01	6.257+02	
200.	3.399+02	1.631+01	3.126+01	2.923+02	
300.	1.365+02	7.425+00	2.796+01	1.011+02	
400.	7.843+01	4.226+00	2.538+01	4.883+01	
500.	5.447+01	2.724+00	2.333+01	2.841+01	
600.	4.216+01	1.901+00	2.167+01	1.858+01	
800.	3.002+01	1.075+00	1.912+01	9.821+00	
1000.	2.408+01	6.907-01	1.723+01	6.162+00	
1500.	1.771+01	3.084-01	1.404+01	2.817+00	5.472-01
2000.	1.561+01	1.739-01	1.199+01	1.698+00	1.750+00
3000.	1.431+01	7.746-02	9.431+00	8.864-01	3.910+00
4000.	1.422+01	4.362-02	7.865+00	5.812-01	5.728+00
5000.	1.452+01	2.794-02	6.792+00	4.270-01	7.270+00
6000.	1.495+01	1.941-02	6.003+00	3.356-01	8.595+00
8000.	1.592+01	1.093-02	4.910+00	2.333-01	1.077+01
10000.	1.686+01	6.995-03	4.180+00	1.781-01	1.249+01
15000.	1.898+01	3.110-03	3.091+00	1.113-01	1.578+01
20000.	2.089+01	1.750-03	2.480+00	8.077-02	1.833+01
30000.	2.396+01	7.779-04	1.803+00	5.207-02	2.210+01
40000.	2.611+01	4.376-04	1.432+00	3.840-02	2.464+01
50000.	2.770+01	2.801-04	1.194+00	3.041-02	2.647+01
60000.	2.895+01	1.945-04	1.028+00	2.517-02	2.790+01
80000.	3.089+01	1.094-04	8.101-01	1.871-02	3.006+01
100000.	3.241+01	7.003-05	6.721-01	1.489-02	3.172+01

Z= 83 BISMUTH

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	8.432+07	4.583+03	2.326-04	8.431+07	
.015	5.621+07	4.583+03	5.225-04	5.621+07	
.020	4.216+07	4.582+03	9.272-04	4.216+07	
.030	2.811+07	4.582+03	2.079-03	2.810+07	
.040	2.108+07	4.582+03	3.682-03	2.108+07	
.050	1.687+07	4.582+03	5.731-03	1.686+07	
.060	1.406+07	4.582+03	8.223-03	1.405+07	
.080	1.054+07	4.581+03	1.451-02	1.054+07	
.100	8.436+06	4.580+03	2.250-02	8.431+06	
.150	5.625+06	4.578+03	4.968-02	5.621+06	
.200	4.220+06	4.574+03	8.662-02	4.216+06	
.300	2.815+06	4.564+03	1.873-01	2.810+06	
.400	2.112+06	4.549+03	3.194-01	2.108+06	
.500	5.907+06	4.532+03	4.779-01	5.903+06	
.600	4.463+06	4.511+03	6.578-01	4.458+06	
.800	2.769+06	4.462+03	1.062+00	2.765+06	
1.000	1.860+06	4.403+03	1.490+00	1.856+06	
1.500	8.510+05	4.226+03	2.516+00	8.468+05	
2.000	4.662+05	4.023+03	3.472+00	4.622+05	
3.000	6.972+05	3.605+03	5.266+00	6.936+05	
4.000	4.424+05	3.225+03	7.027+00	4.392+05	
5.000	2.601+05	2.886+03	8.760+00	2.572+05	
6.000	1.660+05	2.592+03	1.044+01	1.634+05	
8.000	8.073+04	2.117+03	1.350+01	7.860+04	
10.000	4.610+04	1.757+03	1.605+01	4.433+04	
15.000	4.015+04	1.168+03	2.073+01	3.896+04	
20.000	3.083+04	8.287+02	2.418+01	2.998+04	
30.000	1.090+04	4.841+02	2.891+01	1.039+04	
40.000	5.122+03	3.110+02	3.172+01	4.779+03	
50.	2.850+03	2.152+02	3.331+01	2.601+03	
60.	1.772+03	1.572+02	3.421+01	1.581+03	
80.	8.495+02	9.417+01	3.461+01	7.207+02	
100.	1.968+03	6.255+01	3.489+01	1.871+03	
150.	7.159+02	2.919+01	3.353+01	6.531+02	
200.	3.533+02	1.682+01	3.162+01	3.048+02	
300.	1.412+02	7.657+00	2.828+01	1.053+02	
400.	8.090+01	4.359+00	2.567+01	5.087+01	
500.	5.614+01	2.809+00	2.361+01	2.972+01	
600.	4.341+01	1.960+00	2.193+01	1.952+01	
800.	3.082+01	1.109+00	1.935+01	1.036+01	
1000.	2.467+01	7.124-01	1.744+01	6.515+00	
1500.	1.807+01	3.181-01	1.421+01	2.984+00	5.640-01
2000.	1.594+01	1.794-01	1.213+01	1.799+00	1.825+00
3000.	1.460+01	7.990-02	9.546+00	9.381-01	4.040+00
4000.	1.450+01	4.500-02	7.961+00	6.147-01	5.877+00
5000.	1.479+01	2.882-02	6.875+00	4.513-01	7.433+00
6000.	1.523+01	2.002-02	6.076+00	3.545-01	8.777+00
8000.	1.624+01	1.127-02	4.970+00	2.462-01	1.101+01
10000.	1.725+01	7.215-03	4.231+00	1.879-01	1.282+01
15000.	1.956+01	3.208-03	3.129+00	1.174-01	1.631+01
20000.	2.154+01	1.805-03	2.510+00	8.513-02	1.895+01
30000.	2.458+01	8.024-04	1.825+00	5.486-02	2.270+01
40000.	2.672+01	4.514-04	1.449+00	4.045-02	2.523+01
50000.	2.834+01	2.889-04	1.209+00	3.202-02	2.710+01
60000.	2.964+01	2.007-04	1.041+00	2.650-02	2.857+01
80000.	3.160+01	1.129-04	8.200-01	1.970-02	3.076+01
100000.	3.305+01	7.224-05	6.803-01	1.568-02	3.236+01

Z= 84 POLONIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	8.683+07	4.694+03	2.295-04	8.682+07	
.015	5.789+07	4.694+03	5.155-04	5.788+07	
.020	4.342+07	4.694+03	9.148-04	4.341+07	
.030	2.895+07	4.693+03	2.051-03	2.894+07	
.040	2.171+07	4.693+03	3.633-03	2.171+07	
.050	1.737+07	4.693+03	5.656-03	1.736+07	
.060	1.448+07	4.693+03	8.115-03	1.447+07	
.080	1.086+07	4.692+03	1.432-02	1.085+07	
.100	8.687+06	4.691+03	2.221-02	8.682+06	
.150	5.793+06	4.689+03	4.906-02	5.788+06	
.200	4.346+06	4.685+03	8.558-02	4.341+06	
.300	2.899+06	4.674+03	1.852-01	2.894+06	
.400	2.175+06	4.659+03	3.162-01	2.171+06	
.500	6.206+06	4.641+03	4.736-01	6.201+06	
.600	4.725+06	4.620+03	6.526-01	4.721+06	
.800	2.940+06	4.569+03	1.056+00	2.935+06	
1.000	1.972+06	4.507+03	1.487+00	1.968+06	
1.500	9.009+05	4.323+03	2.536+00	8.966+05	
2.000	4.942+05	4.112+03	3.531+00	4.900+05	
3.000	7.357+05	3.681+03	5.416+00	7.320+05	
4.000	4.477+05	3.292+03	7.233+00	4.444+05	
5.000	2.721+05	2.950+03	8.985+00	2.692+05	
6.000	1.738+05	2.652+03	1.066+01	1.711+05	
8.000	8.478+04	2.170+03	1.368+01	8.260+04	
10.000	4.851+04	1.803+03	1.623+01	4.669+04	
15.000	4.218+04	1.203+03	2.098+01	4.096+04	
20.000	3.223+04	8.535+02	2.448+01	3.135+04	
30.000	1.148+04	4.981+02	2.920+01	1.095+04	
40.000	5.392+03	3.198+02	3.201+01	5.040+03	
50.	2.994+03	2.211+02	3.363+01	2.739+03	
60.	1.858+03	1.616+02	3.456+01	1.662+03	
80.	8.902+02	9.673+01	3.497+01	7.585+02	
100.	2.044+03	6.424+01	3.526+01	1.944+03	
150.	7.466+02	2.997+01	3.391+01	6.827+02	
200.	3.695+02	1.727+01	3.199+01	3.202+02	
300.	1.478+02	7.860+00	2.862+01	1.113+02	
400.	8.436+01	4.474+00	2.599+01	5.390+01	
500.	5.822+01	2.883+00	2.390+01	3.144+01	
600.	4.481+01	2.012+00	2.220+01	2.060+01	
800.	3.164+01	1.138+00	1.959+01	1.091+01	
1000.	2.524+01	7.311-01	1.765+01	6.856+00	
1500.	1.843+01	3.265-01	1.438+01	3.139+00	5.849-01
2000.	1.623+01	1.841-01	1.228+01	1.892+00	1.876+00
3000.	1.487+01	8.200-02	9.661+00	9.873-01	4.143+00
4000.	1.477+01	4.618-02	8.057+00	6.470-01	6.016+00
5000.	1.506+01	2.957-02	6.957+00	4.751-01	7.595+00
6000.	1.549+01	2.055-02	6.149+00	3.731-01	8.950+00
8000.	1.648+01	1.156-02	5.029+00	2.592-01	1.118+01
10000.	1.747+01	7.404-03	4.282+00	1.978-01	1.298+01
15000.	1.975+01	3.292-03	3.167+00	1.235-01	1.646+01
20000.	2.180+01	1.852-03	2.540+00	8.960-02	1.917+01
30000.	2.504+01	8.234-04	1.847+00	5.774-02	2.313+01
40000.	2.733+01	4.632-04	1.467+00	4.257-02	2.582+01
50000.	2.906+01	2.965-04	1.223+00	3.370-02	2.780+01
60000.	3.043+01	2.059-04	1.053+00	2.789-02	2.935+01
80000.	3.255+01	1.158-04	8.298-01	2.073-02	3.169+01
100000.	3.415+01	7.413-05	6.885-01	1.650-02	3.345+01

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 85 ASTATINE

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	8.856+07	4.806+03	2.337-04	8.856+07	
.015	5.904+07	4.806+03	5.250-04	5.904+07	
.020	4.428+07	4.806+03	9.316-04	4.428+07	
.030	2.952+07	4.806+03	2.089-03	2.952+07	
.040	2.214+07	4.806+03	3.700-03	2.214+07	
.050	1.772+07	4.805+03	5.760-03	1.771+07	
.060	1.476+07	4.805+03	8.264-03	1.476+07	
.080	1.107+07	4.805+03	1.459-02	1.107+07	
.100	8.861+06	4.804+03	2.262-02	8.856+06	
.150	5.909+06	4.801+03	4.996-02	5.904+06	
.200	4.433+06	4.797+03	8.715-02	4.428+06	
.300	2.957+06	4.786+03	1.886-01	2.952+06	
.400	2.219+06	4.771+03	3.219-01	2.214+06	
.500	1.776+06	4.753+03	4.822-01	1.771+06	
.600	4.843+06	4.731+03	6.644-01	4.839+06	
.800	3.017+06	4.678+03	1.075+00	3.012+06	
1.000	2.040+06	4.616+03	1.514+00	2.036+06	
1.500	9.464+05	4.425+03	2.580+00	9.419+05	
2.000	5.229+05	4.205+03	3.591+00	5.187+05	
3.000	7.749+05	3.759+03	5.504+00	7.711+05	
4.000	4.438+05	3.362+03	7.349+00	4.405+05	
5.000	2.854+05	3.014+03	9.128+00	2.824+05	
6.000	1.824+05	2.712+03	1.082+01	1.797+05	
8.000	8.861+04	2.222+03	1.389+01	8.637+04	
10.000	5.055+04	1.848+03	1.644+01	4.869+04	
15.000	4.417+04	1.233+03	2.117+01	4.292+04	
20.000	3.362+04	8.784+02	2.466+01	3.272+04	
30.000	1.193+04	5.123+02	2.945+01	1.139+04	
40.000	5.617+03	3.288+02	3.232+01	5.256+03	
50.	3.129+03	2.273+02	3.396+01	2.868+03	
60.	1.947+03	1.660+02	3.489+01	1.746+03	
80.	9.337+02	9.939+01	3.531+01	7.990+02	
100.	2.120+03	6.599+01	3.563+01	2.018+03	
150.	7.752+02	3.078+01	3.428+01	7.102+02	
200.	3.834+02	1.773+01	3.233+01	3.334+02	
300.	1.531+02	8.071+00	2.894+01	1.161+02	
400.	8.723+01	4.594+00	2.628+01	5.635+01	
500.	6.012+01	2.961+00	2.417+01	3.299+01	
600.	4.620+01	2.066+00	2.245+01	2.168+01	
800.	3.252+01	1.169+00	1.982+01	1.153+01	
1000.	2.587+01	7.507-01	1.786+01	7.258+00	
1500.	1.882+01	3.352-01	1.455+01	3.329+00	6.032-01
2000.	1.656+01	1.890-01	1.242+01	2.008+00	1.935+00
3000.	1.516+01	8.420-02	9.776+00	1.047+00	4.253+00
4000.	1.505+01	4.742-02	8.153+00	6.851-01	6.164+00
5000.	1.535+01	3.037-02	7.040+00	5.027-01	7.780+00
6000.	1.581+01	2.110-02	6.222+00	3.945-01	9.174+00
8000.	1.686+01	1.187-02	5.089+00	2.738-01	1.149+01
10000.	1.792+01	7.602-03	4.333+00	2.087-01	1.337+01
15000.	2.032+01	3.380-03	3.205+00	1.302-01	1.698+01
20000.	2.237+01	1.902-03	2.571+00	9.441-02	1.970+01
30000.	2.554+01	8.455-04	1.869+00	6.079-02	2.360+01
40000.	2.782+01	4.756-04	1.484+00	4.480-02	2.629+01
50000.	2.955+01	3.044-04	1.238+00	3.546-02	2.828+01
60000.	3.092+01	2.114-04	1.066+00	2.934-02	2.982+01
80000.	3.295+01	1.189-04	8.397-01	2.181-02	3.209+01
100000.	3.437+01	7.612-05	6.967-01	1.736-02	3.366+01

Z= 86 RADON

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	9.584+07	4.920+03	2.233-04	9.584+07	
.015	6.390+07	4.920+03	5.016-04	6.389+07	
.020	4.792+07	4.920+03	8.903-04	4.792+07	
.030	3.195+07	4.920+03	1.996-03	3.195+07	
.040	2.396+07	4.919+03	3.536-03	2.396+07	
.050	1.917+07	4.919+03	5.506-03	1.917+07	
.060	1.598+07	4.919+03	7.901-03	1.597+07	
.080	1.198+07	4.918+03	1.395-02	1.198+07	
.100	9.589+06	4.918+03	2.164-02	9.584+06	
.150	6.394+06	4.915+03	4.781-02	6.389+06	
.200	4.797+06	4.911+03	8.344-02	4.792+06	
.300	3.199+06	4.900+03	1.808-01	3.195+06	
.400	2.401+06	4.885+03	3.089-01	2.396+06	
.500	1.922+06	4.866+03	4.634-01	1.917+06	
.600	5.216+06	4.844+03	6.394-01	5.212+06	
.800	3.211+06	4.791+03	1.038+00	3.207+06	
1.000	2.155+06	4.727+03	1.467+00	2.150+06	
1.500	9.921+05	4.530+03	2.532+00	9.876+05	
2.000	5.493+05	4.301+03	3.566+00	5.450+05	
3.000	5.640+05	3.839+03	5.556+00	5.602+05	
4.000	4.698+05	3.432+03	7.462+00	4.664+05	
5.000	2.984+05	3.079+03	9.280+00	2.953+05	
6.000	1.907+05	2.772+03	1.100+01	1.879+05	
8.000	9.312+04	2.275+03	1.408+01	9.083+04	
10.000	5.328+04	1.894+03	1.664+01	5.137+04	
15.000	4.631+04	1.268+03	2.139+01	4.502+04	
20.000	3.486+04	9.040+02	2.491+01	3.393+04	
30.000	1.248+04	5.270+02	2.973+01	1.193+04	
40.000	5.891+03	3.381+02	3.262+01	5.520+03	
50.	3.282+03	2.337+02	3.428+01	3.014+03	
60.	2.041+03	1.707+02	3.524+01	1.836+03	
80.	9.775+02	1.022+02	3.567+01	8.396+02	
100.	2.196+03	6.783+01	3.601+01	2.093+03	
150.	8.074+02	3.164+01	3.466+01	7.412+02	
200.	4.004+02	1.823+01	3.270+01	3.495+02	
300.	1.599+02	8.295+00	2.927+01	1.223+02	
400.	9.079+01	4.721+00	2.658+01	5.949+01	
500.	6.229+01	3.043+00	2.445+01	3.480+01	
600.	4.769+01	2.123+00	2.272+01	2.285+01	
800.	3.338+01	1.201+00	2.005+01	1.213+01	
1000.	2.647+01	7.714-01	1.807+01	7.633+00	
1500.	1.919+01	3.445-01	1.472+01	3.499+00	6.254-01
2000.	1.687+01	1.942-01	1.257+01	2.110+00	1.997+00
3000.	1.544+01	8.652-02	9.891+00	1.100+00	4.361+00
4000.	1.531+01	4.872-02	8.249+00	7.201-01	6.294+00
5000.	1.560+01	3.120-02	7.123+00	5.283-01	7.922+00
6000.	1.606+01	2.168-02	6.295+00	4.147-01	9.327+00
8000.	1.712+01	1.220-02	5.149+00	2.877-01	1.167+01
10000.	1.820+01	7.812-03	4.384+00	2.194-01	1.359+01
15000.	2.073+01	3.474-03	3.242+00	1.369-01	1.735+01
20000.	2.290+01	1.954-03	2.601+00	9.920-02	2.020+01
30000.	2.618+01	8.688-04	1.891+00	6.388-02	2.422+01
40000.	2.850+01	4.888-04	1.502+00	4.708-02	2.695+01
50000.	3.027+01	3.128-04	1.252+00	3.726-02	2.898+01
60000.	3.169+01	2.172-04	1.078+00	3.083-02	3.058+01
80000.	3.382+01	1.222-04	8.496-01	2.292-02	3.295+01
100000.	3.535+01	7.822-05	7.049-01	1.824-02	3.463+01

Z= 87 FRANCIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	9.962+07	5.035+03	2.508-04	9.961+07	
.015	6.641+07	5.035+03	5.632-04	6.641+07	
.020	4.981+07	5.035+03	9.995-04	4.981+07	
.030	3.321+07	5.035+03	2.241-03	3.320+07	
.040	2.491+07	5.034+03	3.969-03	2.490+07	
.050	1.993+07	5.034+03	6.179-03	1.992+07	
.060	1.661+07	5.034+03	8.866-03	1.660+07	
.080	1.246+07	5.033+03	1.565-02	1.245+07	
.100	9.966+06	5.032+03	2.427-02	9.961+06	
.150	6.646+06	5.028+03	5.359-02	6.641+06	
.200	4.986+06	5.023+03	9.347-02	4.981+06	
.300	3.325+06	5.009+03	2.022-01	3.320+06	
.400	2.495+06	4.989+03	3.451-01	2.490+06	
.500	1.997+06	4.966+03	5.168-01	1.992+06	
.600	5.610+06	4.939+03	7.118-01	5.605+06	
.800	3.433+06	4.874+03	1.151+00	3.428+06	
1.000	2.284+06	4.800+03	1.619+00	2.279+06	
1.500	1.040+06	4.591+03	2.752+00	1.035+06	
2.000	5.750+05	4.362+03	3.819+00	5.707+05	
3.000	2.364+05	3.907+03	5.816+00	2.325+05	
4.000	4.879+05	3.499+03	7.715+00	4.844+05	
5.000	3.123+05	3.140+03	9.526+00	3.091+05	
6.000	1.995+05	2.828+03	1.124+01	1.966+05	
8.000	9.731+04	2.324+03	1.431+01	9.497+04	
10.000	5.568+04	1.938+03	1.687+01	5.373+04	
15.000	2.042+04	1.300+03	2.164+01	1.910+04	
20.000	3.637+04	9.290+02	2.517+01	3.541+04	
30.000	1.302+04	5.422+02	3.000+01	1.245+04	
40.000	6.157+03	3.480+02	3.291+01	5.776+03	
50.	3.437+03	2.406+02	3.460+01	3.162+03	
60.	2.139+03	1.757+02	3.558+01	1.928+03	
80.	1.023+03	1.052+02	3.603+01	8.819+02	
100.	5.865+02	6.983+01	3.638+01	4.803+02	
150.	8.377+02	3.257+01	3.503+01	7.701+02	
200.	4.152+02	1.877+01	3.306+01	3.634+02	
300.	1.653+02	8.540+00	2.961+01	1.272+02	
400.	9.374+01	4.861+00	2.689+01	6.199+01	
500.	6.428+01	3.133+00	2.473+01	3.641+01	
600.	4.916+01	2.186+00	2.298+01	2.400+01	
800.	3.431+01	1.237+00	2.028+01	1.280+01	
1000.	2.713+01	7.943-01	1.828+01	8.062+00	
1500.	1.958+01	3.547-01	1.489+01	3.699+00	6.396-01
2000.	1.722+01	2.000-01	1.272+01	2.229+00	2.079+00
3000.	1.575+01	8.908-02	1.001+01	1.161+00	4.496+00
4000.	1.559+01	5.016-02	8.345+00	7.594-01	6.440+00
5000.	1.586+01	3.213-02	7.206+00	5.569-01	8.069+00
6000.	1.631+01	2.232-02	6.369+00	4.369-01	9.479+00
8000.	1.738+01	1.256-02	5.209+00	3.030-01	1.186+01
10000.	1.853+01	8.043-03	4.435+00	2.309-01	1.386+01
15000.	2.126+01	3.576-03	3.280+00	1.440-01	1.783+01
20000.	2.354+01	2.012-03	2.631+00	1.043-01	2.080+01
30000.	2.684+01	8.945-04	1.913+00	6.716-02	2.486+01
40000.	2.921+01	5.032-04	1.519+00	4.949-02	2.764+01
50000.	3.105+01	3.221-04	1.267+00	3.917-02	2.974+01
60000.	3.252+01	2.237-04	1.091+00	3.240-02	3.140+01
80000.	3.469+01	1.258-04	8.595-01	2.409-02	3.381+01
100000.	3.614+01	8.053-05	7.131-01	1.916-02	3.540+01

TABLE II, CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 88 RADIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.044+08	5.151+03	2.809-04	1.044+08	
.015	6.960+07	5.151+03	6.309-04	6.960+07	
.020	5.220+07	5.151+03	1.119-03	5.220+07	
.030	3.480+07	5.151+03	2.509-03	3.480+07	
.040	2.610+07	5.151+03	4.445-03	2.610+07	
.050	2.088+07	5.150+03	6.919-03	2.088+07	
.060	1.740+07	5.150+03	9.926-03	1.740+07	
.080	1.305+07	5.149+03	1.751-02	1.305+07	
.100	1.044+07	5.148+03	2.716-02	1.044+07	
.150	6.965+06	5.143+03	5.994-02	6.960+06	
.200	5.225+06	5.137+03	1.045-01	5.220+06	
.300	3.485+06	5.121+03	2.258-01	3.480+06	
.400	2.615+06	5.099+03	3.848-01	2.610+06	
.500	2.093+06	5.072+03	5.754-01	2.088+06	
.600	1.745+06	5.040+03	7.914-01	1.740+06	
.800	3.594+06	4.968+03	1.275+00	3.589+06	
1.000	2.403+06	4.886+03	1.786+00	2.398+06	
1.500	1.102+06	4.665+03	2.995+00	1.097+06	
2.000	6.106+05	4.432+03	4.098+00	6.062+05	
3.000	2.500+05	3.974+03	6.105+00	2.460+05	
4.000	5.131+05	3.563+03	7.995+00	5.096+05	
5.000	3.279+05	3.200+03	9.796+00	3.247+05	
6.000	2.096+05	2.884+03	1.150+01	2.067+05	
8.000	1.023+05	2.373+03	1.455+01	9.988+04	
10.000	5.845+04	1.982+03	1.711+01	5.645+04	
15.000	2.128+04	1.335+03	2.189+01	1.992+04	
20.000	3.815+04	9.540+02	2.543+01	3.717+04	
30.000	1.361+04	5.576+02	3.029+01	1.303+04	
40.000	6.441+03	3.581+02	3.322+01	6.050+03	
50.	3.599+03	2.476+02	3.492+01	3.317+03	
60.	2.243+03	1.809+02	3.591+01	2.026+03	
80.	1.074+03	1.083+02	3.637+01	9.295+02	
100.	6.161+02	7.193+01	3.674+01	5.075+02	
150.	8.793+02	3.356+01	3.540+01	8.103+02	
200.	4.359+02	1.934+01	3.342+01	3.831+02	
300.	1.727+02	8.800+00	2.993+01	1.340+02	
400.	9.742+01	5.009+00	2.719+01	6.522+01	
500.	6.655+01	3.229+00	2.501+01	3.831+01	
600.	5.075+01	2.253+00	2.324+01	2.526+01	
800.	3.527+01	1.275+00	2.051+01	1.348+01	
1000.	2.780+01	8.186-01	1.849+01	8.499+00	
1500.	2.000+01	3.655-01	1.506+01	3.902+00	6.724-01
2000.	1.754+01	2.061-01	1.286+01	2.353+00	2.119+00
3000.	1.605+01	9.181-02	1.012+01	1.225+00	4.612+00
4000.	1.594+01	5.170-02	8.441+00	8.007-01	6.650+00
5000.	1.627+01	3.311-02	7.289+00	5.869-01	8.361+00
6000.	1.676+01	2.301-02	6.442+00	4.602-01	9.832+00
8000.	1.787+01	1.295-02	5.269+00	3.190-01	1.227+01
10000.	1.900+01	8.290-03	4.486+00	2.430-01	1.426+01
15000.	2.162+01	3.686-03	3.318+00	1.514-01	1.815+01
20000.	2.391+01	2.074-03	2.661+00	1.097-01	2.113+01
30000.	2.742+01	9.220-04	1.935+00	7.056-02	2.542+01
40000.	2.992+01	5.187-04	1.536+00	5.198-02	2.833+01
50000.	3.181+01	3.320-04	1.282+00	4.113-02	3.049+01
60000.	3.332+01	2.305-04	1.103+00	3.403-02	3.218+01
80000.	3.559+01	1.297-04	8.694-01	2.529-02	3.470+01
100000.	3.724+01	8.300-05	7.213-01	2.012-02	3.649+01

Z= 89 ACTINIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.070+08	5.269+03	2.873-04	1.070+08	
.015	7.136+07	5.269+03	6.452-04	7.136+07	
.020	5.352+07	5.269+03	1.145-03	5.352+07	
.030	3.568+07	5.269+03	2.566-03	3.568+07	
.040	2.676+07	5.268+03	4.545-03	2.676+07	
.050	2.141+07	5.268+03	7.076-03	2.141+07	
.060	1.784+07	5.268+03	1.015-02	1.784+07	
.080	1.338+07	5.267+03	1.791-02	1.338+07	
.100	1.071+07	5.265+03	2.777-02	1.070+07	
.150	7.141+06	5.261+03	6.130-02	7.136+06	
.200	5.357+06	5.254+03	1.069-01	5.352+06	
.300	3.573+06	5.237+03	2.309-01	3.568+06	
.400	2.681+06	5.214+03	3.936-01	2.676+06	
.500	2.146+06	5.186+03	5.886-01	2.141+06	
.600	1.789+06	5.153+03	8.097-01	1.784+06	
.800	3.615+06	5.078+03	1.305+00	3.610+06	
1.000	2.474+06	4.993+03	1.828+00	2.469+06	
1.500	1.160+06	4.762+03	3.067+00	1.155+06	
2.000	6.462+05	4.519+03	4.200+00	6.417+05	
3.000	2.628+05	4.047+03	6.256+00	2.588+05	
4.000	5.353+05	3.628+03	8.181+00	5.317+05	
5.000	3.265+05	3.262+03	1.000+01	3.233+05	
6.000	2.184+05	2.943+03	1.172+01	2.155+05	
8.000	1.066+05	2.426+03	1.478+01	1.042+05	
10.000	6.068+04	2.030+03	1.734+01	5.864+04	
15.000	2.211+04	1.381+03	2.212+01	2.071+04	
20.000	3.913+04	9.799+02	2.567+01	3.813+04	
30.000	1.425+04	5.733+02	3.056+01	1.365+04	
40.000	6.745+03	3.683+02	3.351+01	6.343+03	
50.	3.757+03	2.548+02	3.524+01	3.467+03	
60.	2.334+03	1.862+02	3.624+01	2.111+03	
80.	1.115+03	1.115+02	3.672+01	9.672+02	
100.	6.426+02	7.405+01	3.710+01	5.315+02	
150.	9.071+02	3.455+01	3.577+01	8.368+02	
200.	4.507+02	1.991+01	3.378+01	3.970+02	
300.	1.792+02	9.063+00	3.026+01	1.399+02	
400.	1.010+02	5.158+00	2.750+01	6.834+01	
500.	6.873+01	3.325+00	2.529+01	4.011+01	
600.	5.223+01	2.320+00	2.350+01	2.641+01	
800.	3.612+01	1.313+00	2.074+01	1.407+01	
1000.	2.840+01	8.431-01	1.869+01	8.866+00	
1500.	2.037+01	3.765-01	1.523+01	4.072+00	6.899-01
2000.	1.783+01	2.123-01	1.301+01	2.456+00	2.153+00
3000.	1.631+01	9.456-02	1.024+01	1.280+00	4.703+00
4000.	1.622+01	5.325-02	8.537+00	8.376-01	6.791+00
5000.	1.655+01	3.410-02	7.371+00	6.142-01	8.534+00
6000.	1.704+01	2.369-02	6.515+00	4.819-01	1.002+01
8000.	1.811+01	1.334-02	5.329+00	3.341-01	1.244+01
10000.	1.917+01	8.538-03	4.537+00	2.546-01	1.437+01
15000.	2.170+01	3.796-03	3.355+00	1.587-01	1.818+01
20000.	2.406+01	2.136-03	2.691+00	1.150-01	2.125+01
30000.	2.785+01	9.495-04	1.957+00	7.401-02	2.581+01
40000.	3.047+01	5.342-04	1.554+00	5.453-02	2.886+01
50000.	3.238+01	3.419-04	1.296+00	4.315-02	3.104+01
60000.	3.389+01	2.374-04	1.116+00	3.570-02	3.274+01
80000.	3.619+01	1.336-04	8.792-01	2.653-02	3.529+01
100000.	3.795+01	8.549-05	7.295-01	2.111-02	3.720+01

Z= 90 THORIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.121+08	5.388+03	2.903-04	1.121+08	
.015	7.474+07	5.388+03	6.520-04	7.474+07	
.020	5.606+07	5.388+03	1.157-03	5.605+07	
.030	3.737+07	5.388+03	2.594-03	3.737+07	
.040	2.803+07	5.388+03	4.594-03	2.803+07	
.050	2.243+07	5.387+03	7.151-03	2.242+07	
.060	1.869+07	5.387+03	1.026-02	1.868+07	
.080	1.402+07	5.386+03	1.810-02	1.401+07	
.100	1.122+07	5.384+03	2.807-02	1.121+07	
.150	7.479+06	5.380+03	6.196-02	7.474+06	
.200	5.611+06	5.373+03	1.080-01	5.605+06	
.300	3.742+06	5.356+03	2.335-01	3.737+06	
.400	2.808+06	5.333+03	3.981-01	2.803+06	
.500	2.247+06	5.304+03	5.954-01	2.242+06	
.600	1.874+06	5.271+03	8.192-01	1.868+06	
.800	3.886+06	5.195+03	1.321+00	3.880+06	
1.000	2.600+06	5.107+03	1.852+00	2.595+06	
1.500	1.197+06	4.868+03	3.114+00	1.192+06	
2.000	6.656+05	4.614+03	4.272+00	6.610+05	
3.000	2.745+05	4.123+03	6.379+00	2.704+05	
4.000	4.799+05	3.695+03	8.341+00	4.762+05	
5.000	3.410+05	3.324+03	1.019+01	3.377+05	
6.000	2.283+05	3.002+03	1.192+01	2.253+05	
8.000	1.115+05	2.477+03	1.499+01	1.090+05	
10.000	6.362+04	2.075+03	1.756+01	6.152+04	
15.000	2.314+04	1.413+03	2.236+01	2.171+04	
20.000	3.596+04	1.006+03	2.593+01	3.493+04	
30.000	1.482+04	5.892+02	3.084+01	1.420+04	
40.000	7.052+03	3.788+02	3.381+01	6.639+03	
50.	3.956+03	2.621+02	3.555+01	3.658+03	
60.	2.471+03	1.916+02	3.658+01	2.243+03	
80.	1.184+03	1.147+02	3.706+01	1.032+03	
100.	6.762+02	7.622+01	3.747+01	5.625+02	
150.	9.421+02	3.557+01	3.613+01	8.704+02	
200.	4.683+02	2.050+01	3.413+01	4.137+02	
300.	1.859+02	9.330+00	3.059+01	1.460+02	
400.	1.046+02	5.311+00	2.779+01	7.149+01	
500.	7.109+01	3.423+00	2.557+01	4.209+01	
600.	5.393+01	2.389+00	2.376+01	2.778+01	
800.	3.715+01	1.352+00	2.097+01	1.482+01	
1000.	2.911+01	8.681-01	1.890+01	9.344+00	
1500.	2.079+01	3.876-01	1.540+01	4.287+00	7.167-01
2000.	1.819+01	2.186-01	1.315+01	2.583+00	2.232+00
3000.	1.663+01	9.736-02	1.035+01	1.344+00	4.837+00
4000.	1.652+01	5.483-02	8.633+00	8.790-01	6.958+00
5000.	1.686+01	3.512-02	7.454+00	6.443-01	8.731+00
6000.	1.737+01	2.440-02	6.588+00	5.053-01	1.025+01
8000.	1.850+01	1.373-02	5.389+00	3.503-01	1.274+01
10000.	1.963+01	8.792-03	4.588+00	2.669-01	1.476+01
15000.	2.226+01	3.909-03	3.393+00	1.664-01	1.870+01
20000.	2.459+01	2.199-03	2.722+00	1.206-01	2.175+01
30000.	2.823+01	9.778-04	1.979+00	7.759-02	2.617+01
40000.	3.078+01	5.500-04	1.571+00	5.716-02	2.915+01
50000.	3.268+01	3.521-04	1.311+00	4.524-02	3.132+01
60000.	3.416+01	2.445-04	1.129+00	3.743-02	3.300+01
80000.	3.635+01	1.375-04	8.891-01	2.782-02	3.543+01
100000.	3.788+01	8.803-05	7.377-01	2.213-02	3.712+01

TABLE II, CONT.

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 91 PROTACTINIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.147+08	5.508+03	2.820-04	1.147+08	
.015	7.647+07	5.508+03	6.333-04	7.646+07	
.020	5.735+07	5.508+03	1.124-03	5.735+07	
.030	3.824+07	5.508+03	2.519-03	3.823+07	
.040	2.868+07	5.508+03	4.463-03	2.867+07	
.050	2.294+07	5.508+03	6.947-03	2.294+07	
.060	1.912+07	5.507+03	9.967-03	1.912+07	
.080	1.434+07	5.506+03	1.759-02	1.434+07	
.100	1.148+07	5.505+03	2.727-02	1.147+07	
.150	7.652+06	5.500+03	6.021-02	7.646+06	
.200	5.740+06	5.494+03	1.050-01	5.735+06	
.300	3.829+06	5.477+03	2.270-01	3.823+06	
.400	2.873+06	5.455+03	3.871-01	2.867+06	
.500	2.299+06	5.427+03	5.792-01	2.294+06	
.600	1.917+06	5.395+03	7.972-01	1.912+06	
.800	3.596+06	5.320+03	1.286+00	3.591+06	
1.000	2.557+06	5.234+03	1.806+00	2.552+06	
1.500	1.243+06	4.997+03	3.047+00	1.238+06	
2.000	7.025+05	4.743+03	4.195+00	6.977+05	
3.000	2.895+05	4.244+03	6.301+00	2.853+05	
4.000	5.020+05	3.801+03	8.271+00	4.982+05	
5.000	3.369+05	3.413+03	1.013+01	3.335+05	
6.000	2.380+05	3.077+03	1.187+01	2.349+05	
8.000	1.163+05	2.534+03	1.498+01	1.138+05	
10.000	6.609+04	2.120+03	1.759+01	6.395+04	
15.000	2.404+04	1.431+03	2.249+01	2.259+04	
20.000	2.681+04	1.034+03	2.612+01	2.575+04	
30.000	1.548+04	6.062+02	3.108+01	1.484+04	
40.000	7.372+03	3.899+02	3.409+01	6.948+03	
50.	4.113+03	2.699+02	3.586+01	3.807+03	
60.	2.555+03	1.973+02	3.691+01	2.321+03	
80.	1.221+03	1.182+02	3.741+01	1.065+03	
100.	7.037+02	7.853+01	3.783+01	5.873+02	
150.	9.783+02	3.666+01	3.650+01	9.051+02	
200.	4.870+02	2.112+01	3.449+01	4.314+02	
300.	1.930+02	9.617+00	3.091+01	1.525+02	
400.	1.083+02	5.475+00	2.809+01	7.469+01	
500.	7.337+01	3.529+00	2.585+01	4.399+01	
600.	5.553+01	2.462+00	2.402+01	2.904+01	
800.	3.810+01	1.393+00	2.121+01	1.551+01	
1000.	2.978+01	8.948-01	1.911+01	9.775+00	
1500.	2.120+01	3.996-01	1.557+01	4.486+00	7.402-01
2000.	1.853+01	2.253-01	1.330+01	2.704+00	2.302+00
3000.	1.692+01	1.004-01	1.047+01	1.407+00	4.947+00
4000.	1.678+01	5.652-02	8.728+00	9.204-01	7.078+00
5000.	1.710+01	3.620-02	7.537+00	6.748-01	8.854+00
6000.	1.759+01	2.515-02	6.661+00	5.293-01	1.038+01
8000.	1.874+01	1.416-02	5.448+00	3.670-01	1.291+01
10000.	1.991+01	9.063-03	4.639+00	2.797-01	1.499+01
15000.	2.273+01	4.030-03	3.431+00	1.744-01	1.912+01
20000.	2.520+01	2.267-03	2.752+00	1.264-01	2.232+01
30000.	2.898+01	1.008-03	2.001+00	8.133-02	2.689+01
40000.	3.164+01	5.670-04	1.589+00	5.992-02	2.999+01
50000.	3.366+01	3.629-04	1.325+00	4.743-02	3.228+01
60000.	3.525+01	2.521-04	1.141+00	3.924-02	3.407+01
80000.	3.763+01	1.418-04	8.990-01	2.916-02	3.670+01
100000.	3.929+01	9.075-05	7.459-01	2.320-02	3.852+01

Z= 92 URANIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.206+08	5.630+03	2.743-04	1.205+08	
.015	8.037+07	5.630+03	6.160-04	8.037+07	
.020	6.028+07	5.630+03	1.093-03	6.027+07	
.030	4.019+07	5.630+03	2.451-03	4.018+07	
.040	3.014+07	5.630+03	4.341-03	3.014+07	
.050	2.412+07	5.629+03	6.758-03	2.411+07	
.060	2.010+07	5.629+03	9.696-03	2.009+07	
.080	1.507+07	5.628+03	1.711-02	1.507+07	
.100	1.206+07	5.627+03	2.654-02	1.205+07	
.150	8.042+06	5.622+03	5.860-02	8.037+06	
.200	6.033+06	5.616+03	1.022-01	6.027+06	
.300	4.024+06	5.599+03	2.211-01	4.018+06	
.400	3.019+06	5.577+03	3.774-01	3.014+06	
.500	2.417+06	5.550+03	5.651-01	2.411+06	
.600	2.015+06	5.518+03	7.783-01	2.009+06	
.800	3.645+06	5.443+03	1.258+00	3.640+06	
1.000	2.654+06	5.358+03	1.770+00	2.648+06	
1.500	1.298+06	5.119+03	3.007+00	1.293+06	
2.000	7.316+05	4.861+03	4.167+00	7.268+05	
3.000	3.025+05	4.351+03	6.317+00	2.982+05	
4.000	5.216+05	3.895+03	8.317+00	5.177+05	
5.000	3.478+05	3.495+03	1.019+01	3.443+05	
6.000	2.465+05	3.149+03	1.193+01	2.433+05	
8.000	1.210+05	2.594+03	1.504+01	1.184+05	
10.000	6.914+04	2.173+03	1.767+01	6.695+04	
15.000	2.516+04	1.475+03	2.267+01	2.366+04	
20.000	2.794+04	1.062+03	2.638+01	2.686+04	
30.000	1.619+04	6.233+02	3.141+01	1.553+04	
40.000	7.741+03	4.010+02	3.443+01	7.305+03	
50.	4.334+03	2.776+02	3.620+01	4.021+03	
60.	2.699+03	2.030+02	3.725+01	2.459+03	
80.	1.289+03	1.216+02	3.776+01	1.129+03	
100.	7.380+02	8.079+01	3.820+01	6.190+02	
150.	1.014+03	3.771+01	3.688+01	9.394+02	
200.	5.071+02	2.173+01	3.485+01	4.505+02	
300.	2.017+02	9.894+00	3.125+01	1.605+02	
400.	1.130+02	5.632+00	2.840+01	7.894+01	
500.	7.633+01	3.630+00	2.613+01	4.656+01	
600.	5.755+01	2.533+00	2.428+01	3.074+01	
800.	3.927+01	1.433+00	2.144+01	1.640+01	
1000.	3.057+01	9.206-01	1.932+01	1.032+01	
1500.	2.164+01	4.111-01	1.574+01	4.726+00	7.599-01
2000.	1.887+01	2.318-01	1.345+01	2.844+00	2.345+00
3000.	1.722+01	1.033-01	1.058+01	1.478+00	5.063+00
4000.	1.711+01	5.815-02	8.824+00	9.657-01	7.267+00
5000.	1.746+01	3.724-02	7.620+00	7.077-01	9.100+00
6000.	1.798+01	2.588-02	6.735+00	5.549-01	1.066+01
8000.	1.912+01	1.456-02	5.508+00	3.847-01	1.321+01
10000.	2.027+01	9.324-03	4.690+00	2.931-01	1.527+01
15000.	2.295+01	4.146-03	3.468+00	1.827-01	1.930+01
20000.	2.538+01	2.333-03	2.782+00	1.324-01	2.246+01
30000.	2.919+01	1.037-03	2.023+00	8.520-02	2.708+01
40000.	3.185+01	5.834-04	1.606+00	6.278-02	3.018+01
50000.	3.383+01	3.734-04	1.340+00	4.968-02	3.244+01
60000.	3.539+01	2.593-04	1.154+00	4.111-02	3.419+01
80000.	3.773+01	1.459-04	9.089-01	3.055-02	3.679+01
100000.	3.944+01	9.336-05	7.541-01	2.431-02	3.866+01

Z= 93 NEPTUNIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
.010	1.228+08	5.753+03	2.784-04	1.228+08	
.015	8.186+07	5.753+03	6.252-04	8.185+07	
.020	6.140+07	5.753+03	1.109-03	6.139+07	
.030	4.093+07	5.753+03	2.487-03	4.093+07	
.040	3.070+07	5.753+03	4.405-03	3.070+07	
.050	2.456+07	5.752+03	6.858-03	2.456+07	
.060	2.047+07	5.752+03	9.840-03	2.046+07	
.080	1.535+07	5.751+03	1.736-02	1.535+07	
.100	1.228+07	5.750+03	2.693-02	1.228+07	
.150	8.191+06	5.745+03	5.945-02	8.185+06	
.200	6.145+06	5.739+03	1.037-01	6.139+06	
.300	4.098+06	5.723+03	2.242-01	4.093+06	
.400	3.075+06	5.700+03	3.825-01	3.070+06	
.500	2.461+06	5.673+03	5.725-01	2.456+06	
.600	2.052+06	5.641+03	7.882-01	2.046+06	
.800	2.725+06	5.567+03	1.273+00	2.720+06	
1.000	2.293+06	5.481+03	1.788+00	2.288+06	
1.500	1.315+06	5.241+03	3.026+00	1.310+06	
2.000	7.847+05	4.980+03	4.178+00	7.797+05	
3.000	3.263+05	4.459+03	6.305+00	3.218+05	
4.000	5.453+05	3.991+03	8.299+00	5.413+05	
5.000	3.652+05	3.580+03	1.018+01	3.616+05	
6.000	2.564+05	3.223+03	1.195+01	2.532+05	
8.000	1.262+05	2.652+03	1.511+01	1.236+05	
10.000	7.211+04	2.219+03	1.777+01	6.987+04	
15.000	2.625+04	1.498+03	2.279+01	2.473+04	
20.000	2.909+04	1.090+03	2.652+01	2.797+04	
30.000	1.677+04	6.407+02	3.159+01	1.610+04	
40.000	8.029+03	4.126+02	3.465+01	7.581+03	
50.	4.499+03	2.858+02	3.647+01	4.177+03	
60.	2.804+03	2.090+02	3.756+01	2.557+03	
80.	1.343+03	1.253+02	3.811+01	1.179+03	
100.	7.715+02	8.327+01	3.858+01	6.497+02	
150.	1.052+03	3.888+01	3.726+01	9.755+02	
200.	5.257+02	2.241+01	3.521+01	4.681+02	
300.	2.087+02	1.020+01	3.158+01	1.669+02	
400.	1.167+02	5.810+00	2.870+01	8.216+01	
500.	7.869+01	3.745+00	2.641+01	4.853+01	
600.	5.923+01	2.613+00	2.455+01	3.207+01	
800.	4.028+01	1.479+00	2.167+01	1.713+01	
1000.	3.127+01	9.498-01	1.953+01	1.079+01	
1500.	2.207+01	4.241-01	1.591+01	4.944+00	7.871-01
2000.	1.919+01	2.391-01	1.359+01	2.976+00	2.387+00
3000.	1.754+01	1.065-01	1.070+01	1.547+00	5.195+00
4000.	1.749+01	6.000-02	8.920+00	1.011+00	7.499+00
5000.	1.790+01	3.843-02	7.703+00	7.407-01	9.415+00
6000.	1.845+01	2.670-02	6.808+00	5.809-01	1.103+01
8000.	1.961+01	1.503-02	5.568+00	4.027-01	1.363+01
10000.	2.072+01	9.620-03	4.741+00	3.068-01	1.566+01
15000.	2.332+01	4.278-03	3.506+00	1.913-01	1.961+01
20000.	2.583+01	2.407-03	2.812+00	1.386-01	2.287+01
30000.	2.995+01	1.070-03	2.045+00	8.923-02	2.781+01
40000.	3.273+01	6.019-04	1.624+00	6.575-02	3.104+01
50000.	3.471+01	3.853-04	1.354+00	5.204-02	3.331+01
60000.	3.624+01	2.676-04	1.166+00	4.305-02	3.503+01
80000.	3.859+01	1.505-04	9.187-01	3.200-02	3.764+01
100000.	4.045+01	9.633-05	7.623-01	2.546-02	3.966+01

TABLE II, CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 94 PLUTONIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.286+08	5.878+03	2.733-04	1.286+08
.015	8.574+07	5.878+03	6.138-04	8.573+07
.020	6.430+07	5.878+03	1.089-03	6.430+07
.030	4.287+07	5.877+03	2.442-03	4.286+07
.040	3.215+07	5.877+03	4.325-03	3.215+07
.050	2.572+07	5.877+03	6.733-03	2.572+07
.060	2.144+07	5.876+03	9.661-03	2.143+07
.080	1.608+07	5.875+03	1.705-02	1.607+07
.100	1.287+07	5.874+03	2.644-02	1.286+07
.150	8.579+06	5.870+03	5.838-02	8.573+06
.200	6.436+06	5.864+03	1.018-01	6.430+06
.300	4.292+06	5.848+03	2.203-01	4.286+06
.400	3.221+06	5.827+03	3.758-01	3.215+06
.500	2.578+06	5.800+03	5.627-01	2.572+06
.600	2.149+06	5.769+03	7.749-01	2.143+06
.800	1.613+06	5.697+03	1.252+00	1.607+06
1.000	2.874+06	5.614+03	1.761+00	2.868+06
1.500	1.406+06	5.378+03	2.988+00	1.400+06
2.000	7.960+05	5.118+03	4.136+00	7.909+05
3.000	3.326+05	4.594+03	6.262+00	3.280+05
4.000	5.667+05	4.111+03	8.250+00	5.626+05
5.000	3.802+05	3.682+03	1.012+01	3.765+05
6.000	2.671+05	3.312+03	1.188+01	2.638+05
8.000	1.313+05	2.723+03	1.503+01	1.286+05
10.000	7.498+04	2.282+03	1.772+01	7.268+04
15.000	2.732+04	1.564+03	2.291+01	2.573+04
20.000	3.044+04	1.119+03	2.675+01	2.929+04
30.000	1.745+04	6.589+02	3.189+01	1.676+04
40.000	8.389+03	4.245+02	3.498+01	7.930+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	4.722+03	2.941+02	3.682+01	4.391+03	
60.	2.951+03	2.152+02	3.791+01	2.698+03	
80.	1.414+03	1.290+02	3.844+01	1.247+03	
100.	8.084+02	8.574+01	3.893+01	6.837+02	
150.	1.089+03	4.004+01	3.762+01	1.012+03	
200.	5.483+02	2.308+01	3.556+01	4.896+02	
300.	2.171+02	1.051+01	3.190+01	1.747+02	
400.	1.209+02	5.985+00	2.900+01	8.596+01	
500.	8.148+01	3.858+00	2.669+01	5.093+01	
600.	6.128+01	2.692+00	2.481+01	3.378+01	
800.	4.151+01	1.523+00	2.190+01	1.808+01	
1000.	3.211+01	9.784-01	1.974+01	1.139+01	
1500.	2.255+01	4.369-01	1.609+01	5.210+00	8.178-01
2000.	1.956+01	2.464-01	1.374+01	3.130+00	2.448+00
3000.	1.784+01	1.098-01	1.081+01	1.623+00	5.295+00
4000.	1.776+01	6.181-02	9.016+00	1.060+00	7.623+00
5000.	1.816+01	3.959-02	7.785+00	7.761-01	9.554+00
6000.	1.870+01	2.751-02	6.881+00	6.085-01	1.118+01
8000.	1.987+01	1.548-02	5.628+00	4.217-01	1.380+01
10000.	2.099+01	9.911-03	4.792+00	3.212-01	1.587+01
15000.	2.369+01	4.407-03	3.544+00	2.002-01	1.994+01
20000.	2.632+01	2.480-03	2.843+00	1.451-01	2.333+01
30000.	3.063+01	1.102-03	2.067+00	9.341-02	2.847+01
40000.	3.353+01	6.201-04	1.641+00	6.882-02	3.182+01
50000.	3.558+01	3.969-04	1.369+00	5.447-02	3.416+01
60000.	3.716+01	2.756-04	1.179+00	4.507-02	3.594+01
80000.	3.957+01	1.551-04	9.286-01	3.350-02	3.861+01
100000.	4.146+01	9.924-05	7.705-01	2.666-02	4.066+01

Z= 95 AMERICIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.316+08	6.003+03	2.759-04	1.316+08
.015	8.771+07	6.003+03	6.197-04	8.770+07
.020	6.578+07	6.003+03	1.100-03	6.578+07
.030	4.386+07	6.003+03	2.465-03	4.385+07
.040	3.289+07	6.003+03	4.367-03	3.289+07
.050	2.632+07	6.003+03	6.798-03	2.631+07
.060	2.193+07	6.002+03	9.753-03	2.193+07
.080	1.645+07	6.001+03	1.721-02	1.644+07
.100	1.316+07	6.000+03	2.669-02	1.316+07
.150	8.776+06	5.996+03	5.893-02	8.770+06
.200	6.584+06	5.990+03	1.028-01	6.578+06
.300	4.391+06	5.974+03	2.222-01	4.385+06
.400	3.295+06	5.953+03	3.790-01	3.289+06
.500	2.637+06	5.926+03	5.673-01	2.631+06
.600	2.198+06	5.896+03	7.809-01	2.193+06
.800	1.650+06	5.824+03	1.261+00	1.644+06
1.000	3.010+06	5.740+03	1.771+00	3.005+06
1.500	1.470+06	5.503+03	2.994+00	1.464+06
2.000	8.282+05	5.241+03	4.131+00	8.230+05
3.000	3.461+05	4.707+03	6.231+00	3.414+05
4.000	4.186+05	4.213+03	8.208+00	4.144+05
5.000	3.971+05	3.772+03	1.009+01	3.934+05
6.000	2.677+05	3.391+03	1.186+01	2.643+05
8.000	1.365+05	2.785+03	1.505+01	1.337+05
10.000	7.802+04	2.331+03	1.777+01	7.567+04
15.000	2.840+04	1.589+03	2.298+01	2.679+04
20.000	3.170+04	1.150+03	2.684+01	3.052+04
30.000	1.813+04	6.771+02	3.205+01	1.742+04
40.000	8.730+03	4.365+02	3.520+01	8.258+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	4.911+03	3.026+02	3.706+01	4.572+03	
60.	3.068+03	2.214+02	3.819+01	2.808+03	
80.	1.470+03	1.328+02	3.876+01	1.298+03	
100.	8.419+02	8.827+01	3.928+01	7.144+02	
150.	1.129+03	4.124+01	3.796+01	1.050+03	
200.	5.702+02	2.377+01	3.589+01	5.105+02	
300.	2.255+02	1.083+01	3.221+01	1.825+02	
400.	1.253+02	6.165+00	2.929+01	8.984+01	
500.	8.421+01	3.974+00	2.696+01	5.328+01	
600.	6.321+01	2.773+00	2.506+01	3.538+01	
800.	4.265+01	1.569+00	2.213+01	1.895+01	
1000.	3.289+01	1.008+00	1.995+01	1.194+01	
1500.	2.301+01	4.502-01	1.626+01	5.457+00	8.439-01
2000.	1.999+01	2.538-01	1.388+01	3.277+00	2.579+00
3000.	1.822+01	1.131-01	1.093+01	1.699+00	5.483+00
4000.	1.807+01	6.369-02	9.112+00	1.109+00	7.788+00
5000.	1.840+01	4.079-02	7.868+00	8.121-01	9.678+00
6000.	1.890+01	2.834-02	6.954+00	6.366-01	1.128+01
8000.	2.004+01	1.595-02	5.688+00	4.411-01	1.389+01
10000.	2.121+01	1.021-02	4.843+00	3.361-01	1.602+01
15000.	2.413+01	4.541-03	3.582+00	2.095-01	2.034+01
20000.	2.684+01	2.555-03	2.873+00	1.518-01	2.382+01
30000.	3.101+01	1.136-03	2.089+00	9.773-02	2.882+01
40000.	3.385+01	6.390-04	1.659+00	7.201-02	3.212+01
50000.	3.594+01	4.090-04	1.383+00	5.700-02	3.450+01
60000.	3.760+01	2.840-04	1.191+00	4.716-02	3.636+01
80000.	4.010+01	1.598-04	9.385-01	3.505-02	3.913+01
100000.	4.192+01	1.023-04	7.786-01	2.789-02	4.111+01

Z= 96 CURIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.355+08	6.130+03	4.405-04	1.355+08
.015	9.033+07	6.130+03	9.891-04	9.032+07
.020	6.775+07	6.130+03	1.755-03	6.774+07
.030	4.517+07	6.130+03	3.933-03	4.516+07
.040	3.388+07	6.130+03	6.965-03	3.387+07
.050	2.710+07	6.130+03	1.084-02	2.710+07
.060	2.259+07	6.129+03	1.555-02	2.258+07
.080	1.694+07	6.128+03	2.742-02	1.693+07
.100	1.355+07	6.127+03	4.251-02	1.355+07
.150	9.038+06	6.123+03	9.371-02	9.032+06
.200	6.780+06	6.117+03	1.632-01	6.774+06
.300	4.522+06	6.101+03	3.517-01	4.516+06
.400	3.393+06	6.079+03	5.980-01	3.387+06
.500	2.716+06	6.052+03	8.916-01	2.710+06
.600	2.264+06	6.021+03	1.222+00	2.258+06
.800	1.699+06	5.947+03	1.955+00	1.693+06
1.000	3.062+06	5.862+03	2.714+00	3.056+06
1.500	1.517+06	5.618+03	4.420+00	1.511+06
2.000	8.564+05	5.349+03	5.862+00	8.510+05
3.000	3.587+05	4.802+03	8.252+00	3.539+05
4.000	1.848+05	4.299+03	1.038+01	1.805+05
5.000	4.090+05	3.851+03	1.236+01	4.051+05
6.000	2.765+05	3.464+03	1.419+01	2.730+05
8.000	1.404+05	2.847+03	1.741+01	1.376+05
10.000	8.038+04	2.383+03	2.011+01	7.798+04
15.000	2.928+04	1.628+03	2.518+01	2.762+04
20.000	3.269+04	1.178+03	2.891+01	3.149+04
30.000	1.872+04	6.951+02	3.390+01	1.799+04
40.000	9.018+03	4.485+02	3.687+01	8.533+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.084+03	3.110+02	3.858+01	4.734+03	
60.	3.183+03	2.277+02	3.958+01	2.915+03	
80.	1.529+03	1.366+02	3.992+01	1.352+03	
100.	8.755+02	9.082+01	4.031+01	7.444+02	
150.	1.160+03	4.244+01	3.861+01	1.079+03	
200.	5.864+02	2.447+01	3.635+01	5.256+02	
300.	2.319+02	1.115+01	3.255+01	1.882+02	
400.	1.288+02	6.346+00	2.959+01	9.289+01	
500.	8.661+01	4.091+00	2.723+01	5.528+01	
600.	6.496+01	2.855+00	2.531+01	3.679+01	
800.	4.371+01	1.616+00	2.236+01	1.974+01	
1000.	3.363+01	1.038+00	2.015+01	1.244+01	
1500.	2.343+01	4.635-01	1.642+01	5.676+00	8.617-01
2000.	2.035+01	2.613-01	1.403+01	3.406+00	2.652+00
3000.	1.850+01	1.164-01	1.104+01	1.765+00	5.577+00
4000.	1.828+01	6.557-02	9.208+00	1.152+00	7.857+00
5000.	1.856+01	4.200-02	7.951+00	8.442-01	9.720+00
6000.	1.902+01	2.918-02	7.027+00	6.621-01	1.130+01
8000.	2.015+01	1.642-02	5.748+00	4.592-01	1.393+01
10000.	2.138+01	1.051-02	4.894+00	3.500-01	1.612+01
15000.	2.449+01	4.675-03	3.619+00	2.185-01	2.065+01
20000.	2.727+01	2.630-03	2.903+00	1.584-01	2.421+01
30000.	3.135+01	1.169-03	2.111+00	1.021-01	2.913+01
40000.	3.413+01	6.578-04	1.676+00	7.523-02	3.238+01
50000.	3.625+01	4.210-04	1.398+00	5.956-02	3.479+01
60000.	3.793+01	2.924-04	1.204+00	4.929-02	3.668+01
80000.	4.045+01	1.645-04	9.484-01	3.664-02	3.947+01
100000.	4.217+01	1.053-04	7.868-01	2.916-02	4.136+01

PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z= 97 BERKELIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.393+08	6.259+03	4.461-04	1.393+08
.015	9.288+07	6.259+03	1.002-03	9.288+07
.020	6.966+07	6.259+03	1.777-03	6.966+07
.030	4.645+07	6.259+03	3.984-03	4.644+07
.040	3.484+07	6.258+03	7.054-03	3.483+07
.050	2.787+07	6.258+03	1.098-02	2.786+07
.060	2.323+07	6.258+03	1.575-02	2.322+07
.080	1.742+07	6.257+03	2.777-02	1.741+07
.100	1.394+07	6.255+03	4.305-02	1.393+07
.150	9.294+06	6.251+03	9.491-02	9.288+06
.200	6.972+06	6.245+03	1.653-01	6.966+06
.300	4.650+06	6.229+03	3.562-01	4.644+06
.400	3.489+06	6.207+03	6.056-01	3.483+06
.500	2.793+06	6.181+03	9.030-01	2.786+06
.600	2.328+06	6.149+03	1.238+00	2.322+06
.800	1.748+06	6.076+03	1.980+00	1.741+06
1.000	3.190+06	5.990+03	2.749+00	3.184+06
1.500	1.580+06	5.746+03	4.479+00	1.574+06
2.000	9.015+05	5.475+03	5.941+00	8.960+05
3.000	3.810+05	4.920+03	8.366+00	3.761+05
4.000	1.953+05	4.406+03	1.053+01	1.909+05
5.000	4.289+05	3.946+03	1.253+01	4.249+05
6.000	2.733+05	3.548+03	1.439+01	2.697+05
8.000	1.476+05	2.914+03	1.766+01	1.447+05
10.000	8.456+04	2.438+03	2.040+01	8.210+04
15.000	3.067+04	1.667+03	2.556+01	2.897+04
20.000	3.425+04	1.209+03	2.936+01	3.302+04
30.000	1.958+04	7.140+02	3.445+01	1.883+04
40.000	9.461+03	4.610+02	3.749+01	8.962+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.344+03	3.198+02	3.924+01	4.985+03	
60.	3.350+03	2.341+02	4.024+01	3.076+03	
80.	1.612+03	1.405+02	4.071+01	1.431+03	
100.	9.240+02	9.345+01	4.096+01	7.896+02	
150.	1.207+03	4.368+01	3.934+01	1.124+03	
200.	6.131+02	2.519+01	3.708+01	5.508+02	
300.	2.425+02	1.148+01	3.314+01	1.978+02	
400.	1.343+02	6.535+00	3.006+01	9.773+01	
500.	9.005+01	4.213+00	2.763+01	5.821+01	
600.	6.737+01	2.940+00	2.566+01	3.878+01	
800.	4.514+01	1.664+00	2.263+01	2.084+01	
1000.	3.460+01	1.069+00	2.039+01	1.315+01	
1500.	2.399+01	4.773-01	1.661+01	6.010+00	8.929-01
2000.	2.077+01	2.691-01	1.418+01	3.607+00	2.712+00
3000.	1.888+01	1.199-01	1.116+01	1.867+00	5.735+00
4000.	1.871+01	6.753-02	9.304+00	1.217+00	8.122+00
5000.	1.905+01	4.325-02	8.034+00	8.910-01	1.008+01
6000.	1.957+01	3.005-02	7.101+00	6.981-01	1.174+01
8000.	2.077+01	1.691-02	5.808+00	4.835-01	1.446+01
10000.	2.203+01	1.083-02	4.945+00	3.681-01	1.671+01
15000.	2.516+01	4.815-03	3.657+00	2.294-01	2.127+01
20000.	2.802+01	2.709-03	2.933+00	1.662-01	2.492+01
30000.	3.231+01	1.204-03	2.133+00	1.069-01	3.007+01
40000.	3.522+01	6.775-04	1.694+00	7.878-02	3.344+01
50000.	3.737+01	4.336-04	1.413+00	6.235-02	3.589+01
60000.	3.906+01	3.011-04	1.216+00	5.159-02	3.780+01
80000.	4.161+01	1.694-04	9.583-01	3.834-02	4.061+01
100000.	4.341+01	1.084-04	7.950-01	3.051-02	4.258+01

Z= 98 CALIFORNIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.418+08	6.389+03	4.448-04	1.418+08
.015	9.454+07	6.389+03	9.988-04	9.454+07
.020	7.091+07	6.388+03	1.772-03	7.090+07
.030	4.727+07	6.388+03	3.972-03	4.727+07
.040	3.546+07	6.388+03	7.033-03	3.545+07
.050	2.837+07	6.388+03	1.095-02	2.836+07
.060	2.364+07	6.387+03	1.570-02	2.363+07
.080	1.773+07	6.386+03	2.769-02	1.773+07
.100	1.419+07	6.385+03	4.292-02	1.418+07
.150	9.460+06	6.381+03	9.463-02	9.454+06
.200	7.097+06	6.375+03	1.648-01	7.090+06
.300	4.733+06	6.359+03	3.552-01	4.727+06
.400	3.551+06	6.338+03	6.038-01	3.545+06
.500	2.842+06	6.311+03	9.004-01	2.836+06
.600	2.370+06	6.280+03	1.234+00	2.363+06
.800	1.779+06	6.207+03	1.974+00	1.773+06
1.000	3.272+06	6.122+03	2.741+00	3.266+06
1.500	1.643+06	5.877+03	4.465+00	1.637+06
2.000	9.339+05	5.603+03	5.922+00	9.282+05
3.000	3.934+05	5.040+03	8.339+00	3.883+05
4.000	2.028+05	4.515+03	1.050+01	1.983+05
5.000	3.812+05	4.043+03	1.250+01	3.771+05
6.000	2.820+05	3.635+03	1.435+01	2.783+05
8.000	1.517+05	2.983+03	1.762+01	1.487+05
10.000	8.703+04	2.495+03	2.035+01	8.451+04
15.000	3.173+04	1.707+03	2.551+01	3.000+04
20.000	3.536+04	1.238+03	2.930+01	3.409+04
30.000	2.016+04	7.331+02	3.441+01	1.939+04
40.000	9.645+03	4.737+02	3.745+01	9.134+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.477+03	3.288+02	3.920+01	5.109+03	
60.	3.462+03	2.408+02	4.021+01	3.181+03	
80.	1.686+03	1.446+02	4.062+01	1.501+03	
100.	9.680+02	9.615+01	4.105+01	8.308+02	
150.	1.237+03	4.495+01	3.936+01	1.152+03	
200.	6.309+02	2.592+01	3.707+01	5.679+02	
300.	2.491+02	1.181+01	3.320+01	2.041+02	
400.	1.377+02	6.726+00	3.019+01	1.008+02	
500.	9.224+01	4.336+00	2.779+01	6.011+01	
600.	6.897+01	3.026+00	2.584+01	4.011+01	
800.	4.609+01	1.713+00	2.282+01	2.156+01	
1000.	3.526+01	1.100+00	2.057+01	1.359+01	
1500.	2.438+01	4.913-01	1.677+01	6.199+00	9.246-01
2000.	2.106+01	2.770-01	1.432+01	3.717+00	2.746+00
3000.	1.913+01	1.234-01	1.127+01	1.925+00	5.810+00
4000.	1.897+01	6.951-02	9.399+00	1.256+00	8.248+00
5000.	1.933+01	4.452-02	8.117+00	9.206-01	1.025+01
6000.	1.985+01	3.093-02	7.174+00	7.221-01	1.193+01
8000.	2.103+01	1.741-02	5.868+00	5.009-01	1.465+01
10000.	2.222+01	1.115-02	4.996+00	3.819-01	1.683+01
15000.	2.512+01	4.956-03	3.695+00	2.384-01	2.118+01
20000.	2.788+01	2.789-03	2.964+00	1.729-01	2.474+01
30000.	3.230+01	1.240-03	2.155+00	1.114-01	3.003+01
40000.	3.535+01	6.974-04	1.711+00	8.214-02	3.355+01
50000.	3.758+01	4.464-04	1.427+00	6.504-02	3.608+01
60000.	3.931+01	3.100-04	1.229+00	5.383-02	3.803+01
80000.	4.189+01	1.744-04	9.681-01	4.002-02	4.088+01
100000.	4.374+01	1.116-04	8.032-01	3.185-02	4.291+01

Z= 99 EINSTEINIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.463+08	6.520+03	4.504-04	1.463+08
.015	9.756+07	6.520+03	1.011-03	9.756+07
.020	7.317+07	6.519+03	1.795-03	7.317+07
.030	4.878+07	6.519+03	4.022-03	4.878+07
.040	3.659+07	6.519+03	7.122-03	3.658+07
.050	2.927+07	6.519+03	1.108-02	2.927+07
.060	2.440+07	6.518+03	1.590-02	2.439+07
.080	1.830+07	6.518+03	2.804-02	1.829+07
.100	1.464+07	6.516+03	4.346-02	1.463+07
.150	9.762+06	6.513+03	9.582-02	9.756+06
.200	7.323+06	6.507+03	1.669-01	7.317+06
.300	4.884+06	6.493+03	3.597-01	4.878+06
.400	3.665+06	6.473+03	6.115-01	3.658+06
.500	2.933+06	6.449+03	9.118-01	2.927+06
.600	2.445+06	6.420+03	1.250+00	2.439+06
.800	1.836+06	6.352+03	1.999+00	1.829+06
1.000	3.362+06	6.272+03	2.776+00	3.356+06
1.500	1.730+06	6.037+03	4.522+00	1.724+06
2.000	9.849+05	5.769+03	5.999+00	9.791+05
3.000	4.140+05	5.209+03	8.450+00	4.088+05
4.000	2.134+05	4.677+03	1.064+01	2.087+05
5.000	3.994+05	4.193+03	1.266+01	3.952+05
6.000	2.949+05	3.771+03	1.454+01	2.911+05
8.000	1.596+05	3.094+03	1.786+01	1.565+05
10.000	9.201+04	2.586+03	2.064+01	8.940+04
15.000	3.345+04	1.771+03	2.589+01	3.165+04
20.000	1.660+04	1.287+03	2.975+01	1.529+04
30.000	2.112+04	7.632+02	3.495+01	2.032+04
40.000	1.029+04	4.936+02	3.805+01	9.761+03

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	5.819+03	3.428+02	3.987+01	5.436+03	
60.	3.643+03	2.511+02	4.090+01	3.351+03	
80.	1.748+03	1.508+02	4.138+01	1.556+03	
100.	1.001+03	1.004+02	4.169+01	8.590+02	
150.	1.288+03	4.694+01	4.006+01	1.201+03	
200.	6.607+02	2.708+01	3.777+01	5.958+02	
300.	2.602+02	1.234+01	3.377+01	2.141+02	
400.	1.434+02	7.027+00	3.065+01	1.057+02	
500.	9.591+01	4.531+00	2.818+01	6.321+01	
600.	7.166+01	3.162+00	2.617+01	4.233+01	
800.	4.770+01	1.789+00	2.309+01	2.282+01	
1000.	3.635+01	1.149+00	2.080+01	1.440+01	
1500.	2.499+01	5.134-01	1.695+01	6.571+00	9.568-01
2000.	2.154+01	2.895-01	1.447+01	3.938+00	2.846+00
3000.	1.956+01	1.290-01	1.139+01	2.035+00	6.012+00
4000.	1.941+01	7.264-02	9.496+00	1.326+00	8.518+00
5000.	1.978+01	4.652-02	8.200+00	9.703-01	1.056+01
6000.	2.032+01	3.232-02	7.247+00	7.603-01	1.228+01
8000.	2.153+01	1.819-02	5.928+00	5.266-01	1.506+01
10000.	2.275+01	1.165-02	5.047+00	4.011-01	1.729+01
15000.	2.580+01	5.179-03	3.732+00	2.500-01	2.181+01
20000.	2.871+01	2.914-03	2.994+00	1.812-01	2.553+01
30000.	3.326+01	1.295-03	2.177+00	1.167-01	3.097+01
40000.	3.633+01	7.288-04	1.728+00	8.596-02	3.451+01
50000.	3.856+01	4.665-04	1.442+00	6.804-02	3.705+01
60000.	4.032+01	3.240-04	1.241+00	5.630-02	3.903+01
80000.	4.301+01	1.822-04	9.780-01	4.185-02	4.199+01
100000.	4.503+01	1.166-04	8.114-01	3.330-02	4.419+01

TABLE II, CONT. PHOTON CROSS SECTION COMPARISON

BIGGS AND LIGHTHILL IN BARNS/ATOM

Z=100 FERMIUM

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT
.010	1.469+08	6.652+03	4.507-04	1.469+08
.015	9.793+07	6.652+03	1.012-03	9.792+07
.020	7.345+07	6.652+03	1.796-03	7.344+07
.030	4.897+07	6.652+03	4.025-03	4.896+07
.040	3.673+07	6.651+03	7.127-03	3.672+07
.050	2.938+07	6.651+03	1.109-02	2.938+07
.060	2.449+07	6.651+03	1.591-02	2.448+07
.080	1.837+07	6.650+03	2.806-02	1.836+07
.100	1.469+07	6.649+03	4.349-02	1.469+07
.150	9.799+06	6.645+03	9.588-02	9.792+06
.200	7.351+06	6.640+03	1.670-01	7.344+06
.300	4.903+06	6.625+03	3.599-01	4.896+06
.400	3.679+06	6.606+03	6.119-01	3.672+06
.500	2.944+06	6.581+03	9.124-01	2.938+06
.600	2.455+06	6.553+03	1.251+00	2.448+06
.800	1.842+06	6.485+03	2.001+00	1.836+06
1.000	3.455+06	6.405+03	2.778+00	3.449+06
1.500	1.789+06	6.170+03	4.526+00	1.783+06
2.000	1.026+06	5.900+03	6.004+00	1.020+06
3.000	4.338+05	5.333+03	8.458+00	4.284+05
4.000	2.231+05	4.791+03	1.065+01	2.183+05
5.000	4.156+05	4.296+03	1.268+01	4.113+05
6.000	3.048+05	3.864+03	1.456+01	3.009+05
8.000	1.648+05	3.169+03	1.789+01	1.616+05
10.000	9.532+04	2.647+03	2.067+01	9.265+04
15.000	3.466+04	1.811+03	2.593+01	3.282+04
20.000	1.712+04	1.320+03	2.982+01	1.577+04
30.000	2.180+04	7.834+02	3.506+01	2.098+04
40.000	1.068+04	5.071+02	3.819+01	1.013+04

ENERGY (KEV)	TOTAL	COHER. SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
50.	6.048+03	3.523+02	4.000+01	5.655+03	
60.	3.790+03	2.582+02	4.105+01	3.491+03	
80.	1.820+03	1.551+02	4.153+01	1.623+03	
100.	1.042+03	1.032+02	4.192+01	8.964+02	
150.	1.327+03	4.829+01	4.028+01	1.238+03	
200.	6.783+02	2.786+01	3.798+01	6.125+02	
300.	2.682+02	1.270+01	3.400+01	2.216+02	
400.	1.481+02	7.232+00	3.088+01	1.100+02	
500.	9.896+01	4.663+00	2.841+01	6.589+01	
600.	7.373+01	3.255+00	2.640+01	4.408+01	
800.	4.888+01	1.842+00	2.330+01	2.374+01	
1000.	3.715+01	1.183+00	2.100+01	1.496+01	
1500.	2.544+01	5.285-01	1.711+01	6.820+00	9.771-01
2000.	2.194+01	2.980-01	1.461+01	4.085+00	2.939+00
3000.	1.989+01	1.328-01	1.150+01	2.112+00	6.148+00
4000.	1.969+01	7.478-02	9.592+00	1.377+00	8.646+00
5000.	2.001+01	4.789-02	8.282+00	1.008+00	1.068+01
6000.	2.053+01	3.328-02	7.320+00	7.902-01	1.239+01
8000.	2.175+01	1.873-02	5.987+00	5.478-01	1.520+01
10000.	2.305+01	1.199-02	5.098+00	4.175-01	1.752+01
15000.	2.635+01	5.332-03	3.770+00	2.605-01	2.231+01
20000.	2.936+01	3.000-03	3.024+00	1.889-01	2.614+01
30000.	3.382+01	1.334-03	2.199+00	1.217-01	3.149+01
40000.	3.681+01	7.503-04	1.746+00	8.969-02	3.498+01
50000.	3.905+01	4.802-04	1.456+00	7.101-02	3.752+01
60000.	4.083+01	3.335-04	1.254+00	5.876-02	3.951+01
80000.	4.351+01	1.876-04	9.879-01	4.369-02	4.248+01
100000.	4.542+01	1.201-04	8.196-01	3.477-02	4.456+01

TABLE III

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 1 HYDROGEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.225+01	5.803-01	8.442-02	1.158+01
1.5	3.621+00	4.983-01	1.655-01	2.957+00
2	1.776+00	4.141-01	2.486-01	1.114+00
3	9.382-01	2.763-01	3.832-01	2.787-01
4	7.601-01	1.881-01	4.683-01	1.038-01
5	7.015-01	1.340-01	5.194-01	4.814-02
6	6.763-01	9.985-02	5.508-01	2.567-02
8	6.550-01	6.125-02	5.843-01	9.509-03
10	6.450-01	4.120-02	5.994-01	4.400-03
15	6.301-01	1.942-02	6.096-01	1.085-03
20	6.184-01	1.118-02	6.068-01	4.029-04
30	5.976-01	5.060-03	5.924-01	1.002-04
40	5.787-01	2.860-03	5.758-01	3.749-05
50	5.615-01	1.840-03	5.596-01	1.756-05
60	5.456-01	1.280-03	5.443-01	9.470-06
80	5.173-01	7.200-04	5.165-01	3.595-06
100	4.927-01	4.600-04	4.923-01	1.705-06
150	4.436-01	2.000-04	4.434-01	4.455-07
200	4.065-01	1.100-04	4.063-01	1.739-07
300	3.534-01	5.000-05	3.534-01	4.708-08

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.167-01	3.000-05	3.166-01	1.890-08	
500	2.891-01	1.900-05	2.891-01	9.397-09	
600	2.675-01	1.300-05	2.675-01	5.343-09	
800	2.349-01	7.300-06	2.349-01	2.219-09	
1000	2.112-01	4.700-06	2.112-01	1.134-09	
1500	1.716-01	2.096-06	1.716-01	5.569-10	4.350-05
2000	1.465-01	1.181-06	1.464-01	3.362-10	1.790-04
3000	1.157-01	5.256-07	1.151-01	1.890-10	5.522-04
4000	9.700-02	2.959-07	9.600-02	1.318-10	9.950-04
5000	8.430-02	1.894-07	8.287-02	9.972-11	1.434-03
6000	7.501-02	1.316-07	7.323-02	8.090-11	1.775-03
8000	6.239-02	7.410-08	5.988-02	5.815-11	2.511-03
10000	5.431-02	4.747-08	5.099-02	4.502-11	3.317-03
15000	4.222-02	2.091-08	3.771-02	2.949-11	4.513-03
20000	3.588-02	1.159-08	3.025-02	2.184-11	5.633-03
30000	2.910-02	4.967-09	2.200-02	1.431-11	7.098-03
40000	2.558-02	2.681-09	1.746-02	1.060-11	8.114-03
50000	2.357-02	1.630-09	1.457-02	8.397-12	9.005-03
60000	2.217-02	1.066-09	1.254-02	6.943-12	9.627-03
80000	2.058-02	5.250-10	9.882-03	5.142-12	1.070-02
100000	1.982-02	3.035-10	8.199-03	4.074-12	1.162-02

Z= 2 HELIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	4.331+02	2.512+00	7.039-02	4.305+02
1.5	1.140+02	2.347+00	1.492-01	1.115+02
2	4.438+01	2.148+00	2.447-01	4.199+01
3	1.255+01	1.726+00	4.447-01	1.038+01
4	5.780+00	1.353+00	6.251-01	3.802+00
5	3.562+00	1.060+00	7.669-01	1.736+00
6	2.625+00	8.398-01	8.732-01	9.119-01
8	1.892+00	5.542-01	1.009+00	3.291-01
10	1.621+00	3.891-01	1.083+00	1.489-01
15	1.388+00	1.948-01	1.158+00	3.523-02
20	1.305+00	1.159-01	1.177+00	1.269-02
30	1.224+00	5.410-02	1.167+00	3.030-03
40	1.174+00	3.100-02	1.141+00	1.105-03
50	1.133+00	2.000-02	1.113+00	5.083-04
60	1.098+00	1.400-02	1.084+00	2.708-04
80	1.038+00	7.900-03	1.030+00	1.012-04
100	9.879-01	5.060-03	9.828-01	4.761-05
150	8.883-01	2.250-03	8.860-01	1.239-05
200	8.135-01	1.260-03	8.123-01	4.874-06
300	7.071-01	5.600-04	7.066-01	1.354-06

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	6.335-01	3.200-04	6.332-01	5.611-07	
500	5.784-01	1.900-04	5.782-01	2.882-07	
600	5.350-01	1.300-04	5.349-01	1.693-07	
800	4.699-01	7.000-05	4.698-01	7.478-08	
1000	4.224-01	4.000-05	4.224-01	4.052-08	
1500	3.433-01	1.785-05	3.432-01	1.991-08	1.742-04
2000	2.935-01	1.006-05	2.927-01	1.203-08	7.160-04
3000	2.323-01	4.481-06	2.302-01	6.748-09	2.128-03
4000	1.957-01	2.523-06	1.920-01	4.695-09	3.649-03
5000	1.708-01	1.616-06	1.657-01	3.544-09	5.088-03
6000	1.527-01	1.122-06	1.465-01	2.875-09	6.190-03
8000	1.283-01	6.316-07	1.198-01	2.066-09	8.492-03
10000	1.129-01	4.046-07	1.020-01	1.599-09	1.093-02
15000	8.997-02	1.798-07	7.543-02	1.047-09	1.454-02
20000	7.835-02	1.001-07	6.050-02	7.748-10	1.785-02
30000	6.614-02	4.338-08	4.400-02	5.072-10	2.215-02
40000	6.003-02	2.368-08	3.493-02	3.754-10	2.509-02
50000	5.680-02	1.466-08	2.914-02	2.973-10	2.766-02
60000	5.453-02	9.778-09	2.509-02	2.457-10	2.944-02
80000	5.226-02	4.999-09	1.977-02	1.819-10	3.249-02
100000	5.148-02	2.878-09	1.640-02	1.441-10	3.508-02

Z= 3 LITHIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.335+03	4.784+00	3.396-01	2.330+03
1.5	7.201+02	4.005+00	5.195-01	7.156+02
2	3.008+02	3.428+00	6.365-01	2.968+02
3	8.505+01	2.721+00	8.071-01	8.152+01
4	3.481+01	2.279+00	9.528-01	3.158+01
5	1.793+01	1.938+00	1.085+00	1.490+01
6	1.085+01	1.652+00	1.201+00	8.000+00
8	5.553+00	1.209+00	1.386+00	2.958+00
10	3.768+00	9.020-01	1.511+00	1.355+00
15	2.474+00	4.872-01	1.663+00	3.233-01
20	2.132+00	3.010-01	1.715+00	1.163-01
30	1.898+00	1.466-01	1.724+00	2.748-02
40	1.792+00	8.590-02	1.696+00	9.920-03
50	1.719+00	5.610-02	1.658+00	4.525-03
60	1.660+00	3.940-02	1.618+00	2.394-03
80	1.565+00	2.250-02	1.541+00	8.870-04
100	1.486+00	1.440-02	1.471+00	4.154-04
150	1.334+00	6.400-03	1.328+00	1.081-04
200	1.221+00	3.700-03	1.218+00	4.283-05
300	1.061+00	1.600-03	1.060+00	1.222-05

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	9.504-01	8.900-04	9.495-01	5.228-06	
500	8.677-01	5.700-04	8.672-01	2.777-06	
600	8.026-01	3.800-04	8.022-01	1.687-06	
800	7.049-01	2.200-04	7.047-01	7.962-07	
1000	6.336-01	1.300-04	6.335-01	4.593-07	
1500	5.151-01	5.804-05	5.147-01	2.258-07	3.922-04
2000	4.407-01	3.272-05	4.390-01	1.365-07	1.611-03
3000	3.500-01	1.458-05	3.452-01	7.645-08	4.725-03
4000	2.959-01	8.209-06	2.880-01	5.311-08	7.960-03
5000	2.596-01	5.258-06	2.486-01	4.003-08	1.096-02
6000	2.329-01	3.653-06	2.197-01	3.247-08	1.324-02
8000	1.976-01	2.056-06	1.796-01	2.333-08	1.794-02
10000	1.758-01	1.316-06	1.530-01	1.806-08	2.282-02
15000	1.432-01	5.859-07	1.131-01	1.181-08	3.006-02
20000	1.274-01	3.277-07	9.074-02	8.741-09	3.663-02
30000	1.111-01	1.427-07	6.599-02	5.718-09	4.509-02
40000	1.032-01	7.828-08	5.239-02	4.231-09	5.085-02
50000	9.953-02	4.883-08	4.370-02	3.350-09	5.584-02
60000	9.688-02	3.283-08	3.762-02	2.768-09	5.926-02
80000	9.474-02	1.714-08	2.964-02	2.048-09	6.510-02
100000	9.463-02	1.002-08	2.459-02	1.622-09	7.004-02

Z= 4 BERYLLIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	8.486+03	8.886+00	4.011-01	8.477+03
1.5	2.607+03	7.461+00	6.979-01	2.598+03
2	1.089+03	6.215+00	9.247-01	1.082+03
3	3.069+02	4.517+00	1.197+00	3.012+02
4	1.231+02	3.548+00	1.360+00	1.182+02
5	6.093+01	2.945+00	1.487+00	5.650+01
6	3.479+01	2.521+00	1.597+00	3.068+01
8	1.527+01	1.923+00	1.781+00	1.157+01
10	8.815+00	1.501+00	1.926+00	5.389+00
15	4.331+00	8.650-01	2.137+00	1.328+00
20	3.267+00	5.503-01	2.227+00	4.891-01
30	2.661+00	2.759-01	2.265+00	1.196-01
40	2.448+00	1.643-01	2.240+00	4.424-02
50	2.325+00	1.085-01	2.196+00	2.055-02
60	2.235+00	7.680-02	2.147+00	1.103-02
80	2.097+00	4.410-02	2.049+00	4.174-03
100	1.988+00	2.840-02	1.958+00	1.985-03
150	1.782+00	1.280-02	1.768+00	5.288-04
200	1.630+00	7.200-03	1.622+00	2.125-04
300	1.415+00	3.200-03	1.412+00	6.142-05

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.268+00	1.800-03	1.266+00	2.639-05	
500	1.157+00	1.200-03	1.156+00	1.402-05	
600	1.070+00	8.000-04	1.070+00	8.501-06	
800	9.400-01	4.200-04	9.396-01	3.982-06	
1000	8.449-01	2.600-04	8.446-01	2.275-06	
1500	6.870-01	1.161-04	6.862-01	1.119-06	6.979-04
2000	5.883-01	6.549-05	5.853-01	6.765-07	2.864-03
3000	4.687-01	2.918-05	4.603-01	3.785-07	8.343-03
4000	3.979-01	1.644-05	3.840-01	2.626-07	1.393-02
5000	3.505-01	1.053-05	3.314-01	1.978-07	1.906-02
6000	3.158-01	7.315-06	2.929-01	1.604-07	2.293-02
8000	2.704-01	4.116-06	2.395-01	1.152-07	3.084-02
10000	2.429-01	2.636-06	2.039-01	8.919-08	3.897-02
15000	2.019-01	1.173-06	1.508-01	5.832-08	5.105-02
20000	1.829-01	6.583-07	1.210-01	4.315-08	6.194-02
30000	1.639-01	2.874-07	8.798-02	2.821-08	7.589-02
40000	1.551-01	1.583-07	6.985-02	2.087-08	8.529-02
50000	1.517-01	9.891-08	5.826-02	1.652-08	9.340-02
60000	1.491-01	6.697-08	5.016-02	1.365-08	9.890-02
80000	1.478-01	3.535-08	3.952-02	1.010-08	1.083-01
100000	1.489-01	2.093-08	3.279-02	7.993-09	1.162-01

TABLE III, CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 5 BORON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.098+04	1.449+01	3.561-01	2.096+04
1.5	6.681+03	1.256+01	6.698-01	6.668+03
2	2.860+03	1.067+01	9.562-01	2.848+03
3	8.289+02	7.740+00	1.365+00	8.198+02
4	3.368+02	5.868+00	1.629+00	3.293+02
5	1.667+02	4.673+00	1.920+00	1.601+02
6	9.402+01	3.879+00	2.048+00	8.810+01
8	3.903+01	2.890+00	2.226+00	3.392+01
10	2.065+01	2.271+00	2.336+00	1.604+01
15	8.018+00	1.363+00	2.597+00	4.058+00
20	5.126+00	8.880-01	2.718+00	1.520+00
30	3.622+00	4.543-01	2.787+00	3.803-01
40	3.188+00	2.737-01	2.772+00	1.427-01
50	2.975+00	1.823-01	2.726+00	6.697-02
60	2.835+00	1.298-01	2.669+00	3.624-02
80	2.642+00	7.510-02	2.553+00	1.387-02
100	2.497+00	4.870-02	2.442+00	6.652-03
150	2.232+00	2.190-02	2.208+00	1.796-03
200	2.040+00	1.240-02	2.027+00	7.271-04
300	1.771+00	5.500-03	1.765+00	2.120-04

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.585+00	3.100-03	1.582+00	9.153-05	
500	1.447+00	2.000-03	1.445+00	4.877-05	
600	1.338+00	1.300-03	1.337+00	2.961-05	
800	1.175+00	7.000-04	1.174+00	1.389-05	
1000	1.057+00	5.000-04	1.056+00	7.935-06	
1500	8.592-01	2.234-04	8.579-01	3.904-06	1.092-03
2000	7.365-01	1.260-04	7.319-01	2.360-06	4.475-03
3000	5.886-01	5.616-05	5.755-01	1.320-06	1.298-02
4000	5.017-01	3.164-05	4.801-01	9.150-07	2.156-02
5000	4.438-01	2.026-05	4.144-01	6.886-07	2.937-02
6000	4.015-01	1.408-05	3.662-01	5.584-07	3.526-02
8000	3.467-01	7.923-06	2.995-01	4.012-07	4.720-02
10000	3.144-01	5.074-06	2.550-01	3.104-07	5.938-02
15000	2.661-01	2.258-06	1.886-01	2.029-07	7.750-02
20000	2.450-01	1.270-06	1.513-01	1.501-07	9.376-02
30000	2.245-01	5.557-07	1.100-01	9.813-08	1.145-01
40000	2.156-01	3.068-07	8.733-02	7.258-08	1.283-01
50000	2.131-01	1.920-07	7.285-02	5.744-08	1.402-01
60000	2.109-01	1.305-07	6.272-02	4.745-08	1.482-01
80000	2.111-01	6.934-08	4.942-02	3.509-08	1.617-01
100000	2.141-01	4.150-08	4.100-02	2.777-08	1.730-01

Z= 6 CARBON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	4.385+04	2.160+01	3.029-01	4.382+04
1.5	1.415+04	1.929+01	5.989-01	1.413+04
2	6.125+03	1.685+01	9.039-01	6.108+03
3	1.807+03	1.259+01	1.413+00	1.793+03
4	7.430+02	9.548+00	1.785+00	7.317+02
5	3.699+02	7.490+00	2.086+00	3.603+02
6	2.088+02	6.084+00	2.291+00	2.004+02
8	8.546+01	4.361+00	2.561+00	7.854+01
10	4.372+01	3.364+00	2.696+00	3.766+01
15	1.483+01	2.030+00	3.029+00	9.770+00
20	8.256+00	1.343+00	3.188+00	3.725+00
30	4.949+00	7.003-01	3.295+00	9.539-01
40	4.083+00	4.262-01	3.293+00	3.634-01
50	3.706+00	2.856-01	3.248+00	1.725-01
60	3.484+00	2.043-01	3.186+00	9.411-02
80	3.208+00	1.190-01	3.053+00	3.646-02
100	3.018+00	7.750-02	2.923+00	1.761-02
150	2.686+00	3.510-02	2.646+00	4.804-03
200	2.452+00	1.990-02	2.430+00	1.953-03
300	2.126+00	8.800-03	2.117+00	5.698-04

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.903+00	5.000-03	1.898+00	2.451-04	
500	1.736+00	3.100-03	1.733+00	1.299-04	
600	1.606+00	2.200-03	1.604+00	7.837-05	
800	1.410+00	1.200-03	1.409+00	3.628-05	
1000	1.268+00	7.000-04	1.267+00	2.046-05	
1500	1.031+00	3.128-04	1.029+00	1.007-05	1.573-03
2000	8.848-01	1.765-04	8.781-01	6.089-06	6.444-03
3000	7.093-01	7.867-05	6.906-01	3.402-06	1.864-02
4000	6.071-01	4.432-05	5.760-01	2.357-06	3.083-02
5000	5.391-01	2.839-05	4.972-01	1.773-06	4.190-02
6000	4.896-01	1.972-05	4.394-01	1.438-06	5.021-02
8000	4.263-01	1.110-05	3.593-01	1.033-06	6.700-02
10000	3.900-01	7.108-06	3.060-01	7.992-07	8.404-02
15000	3.357-01	3.164-06	2.263-01	5.223-07	1.094-01
20000	3.136-01	1.781-06	1.815-01	3.863-07	1.321-01
30000	2.928-01	7.811-07	1.320-01	2.525-07	1.608-01
40000	2.846-01	4.320-07	1.048-01	1.867-07	1.798-01
50000	2.836-01	2.709-07	8.741-02	1.477-07	1.961-01
60000	2.822-01	1.844-07	7.526-02	1.220-07	2.069-01
80000	2.844-01	9.856-08	5.929-02	9.024-08	2.251-01
100000	2.896-01	5.941-08	4.919-02	7.141-08	2.404-01

Z= 7 NITROGEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	7.898+04	3.011+01	2.524-01	7.895+04
1.5	2.610+04	2.755+01	5.157-01	2.608+04
2	1.149+04	2.465+01	8.128-01	1.147+04
3	3.468+03	1.909+01	1.381+00	3.448+03
4	1.447+03	1.473+01	1.854+00	1.430+03
5	7.269+02	1.159+01	2.215+00	7.131+02
6	4.125+02	9.352+00	2.487+00	4.007+02
8	1.688+02	6.544+00	2.856+00	1.594+02
10	8.535+01	4.942+00	3.095+00	7.731+01
15	2.683+01	2.925+00	3.454+00	2.045+01
20	1.350+01	1.949+00	3.651+00	7.899+00
30	6.880+00	1.021+00	3.802+00	2.056+00
40	5.223+00	6.206-01	3.811+00	7.917-01
50	4.560+00	4.162-01	3.765+00	3.785-01
60	4.205+00	2.982-01	3.699+00	2.076-01
80	3.804+00	1.740-01	3.549+00	8.102-02
100	3.555+00	1.136-01	3.402+00	3.933-02
150	3.145+00	5.150-02	3.083+00	1.080-02
200	2.866+00	2.920-02	2.833+00	4.400-03
300	2.483+00	1.300-02	2.468+00	1.285-03

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.221+00	7.300-03	2.213+00	5.518-04	
500	2.027+00	4.600-03	2.022+00	2.917-04	
600	1.874+00	3.200-03	1.871+00	1.755-04	
800	1.646+00	1.800-03	1.644+00	8.073-05	
1000	1.479+00	1.100-03	1.478+00	4.523-05	
1500	1.204+00	4.918-04	1.201+00	2.224-05	2.147-03
2000	1.034+00	2.775-04	1.024+00	1.344-05	8.785-03
3000	8.311-01	1.237-04	8.057-01	7.498-06	2.533-02
4000	7.139-01	6.969-05	6.720-01	5.192-06	4.177-02
5000	6.368-01	4.464-05	5.801-01	3.905-06	5.666-02
6000	5.805-01	3.102-05	5.126-01	3.164-06	6.780-02
8000	5.094-01	1.746-05	4.192-01	2.271-06	9.022-02
10000	4.698-01	1.118-05	3.569-01	1.756-06	1.129-01
15000	4.106-01	4.975-06	2.640-01	1.147-06	1.466-01
20000	3.885-01	2.801-06	2.118-01	8.482-07	1.767-01
30000	3.688-01	1.231-06	1.540-01	5.542-07	2.148-01
40000	3.622-01	6.821-07	1.223-01	4.098-07	2.400-01
50000	3.635-01	4.285-07	1.020-01	3.242-07	2.615-01
60000	3.635-01	2.917-07	8.780-02	2.677-07	2.757-01
80000	3.688-01	1.568-07	6.918-02	1.980-07	2.996-01
100000	3.770-01	9.499-08	5.739-02	1.566-07	3.196-01

Z= 8 OXYGEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.222+05	3.999+01	1.573-01	1.221+05
1.5	4.171+04	3.720+01	3.617-01	4.167+04
2	1.876+04	3.392+01	6.304-01	1.873+04
3	5.825+03	2.722+01	1.220+00	5.796+03
4	2.475+03	2.150+01	1.770+00	2.451+03
5	1.259+03	1.710+01	2.171+00	1.240+03
6	7.210+02	1.384+01	2.540+00	7.046+02
8	2.978+02	9.617+00	3.063+00	2.851+02
10	1.505+02	7.156+00	3.354+00	1.400+02
15	4.580+01	4.135+00	3.844+00	3.782+01
20	2.164+01	2.746+00	4.086+00	1.481+01
30	9.655+00	1.457+00	4.278+00	3.921+00
40	6.729+00	8.942-01	4.309+00	1.526+00
50	5.609+00	6.026-01	4.271+00	7.350-01
60	5.041+00	4.329-01	4.203+00	4.054-01
80	4.455+00	2.535-01	4.042+00	1.595-01
100	4.122+00	1.661-01	3.878+00	7.782-02
150	3.616+00	7.580-02	3.519+00	2.153-02
200	3.287+00	4.300-02	3.235+00	8.807-03
300	2.842+00	1.920-02	2.820+00	2.580-03

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.541+00	1.080-02	2.529+00	1.109-03	
500	2.317+00	6.900-03	2.310+00	5.859-04	
600	2.143+00	4.700-03	2.138+00	3.522-04	
800	1.881+00	2.600-03	1.878+00	1.616-04	
1000	1.691+00	1.600-03	1.689+00	9.026-05	
1500	1.376+00	7.155-04	1.372+00	4.434-05	2.811-03
2000	1.183+00	4.038-04	1.171+00	2.678-05	1.149-02
3000	9.539-01	1.800-04	9.207-01	1.492-05	3.306-02
4000	8.225-01	1.014-04	7.680-01	1.033-05	5.435-02
5000	7.366-01	6.498-05	6.629-01	7.765-06	7.363-02
6000	6.739-01	4.515-05	5.858-01	6.289-06	8.800-02
8000	5.959-01	2.542-05	4.791-01	4.509-06	1.168-01
10000	5.539-01	1.627-05	4.079-01	3.483-06	1.459-01
15000	4.909-01	7.240-06	3.017-01	2.275-06	1.892-01
20000	4.697-01	4.078-06	2.420-01	1.682-06	2.277-01
30000	4.524-01	1.796-06	1.760-01	1.099-06	2.764-01
40000	4.482-01	9.959-07	1.397-01	8.123-07	3.085-01
50000	4.526-01	6.264-07	1.165-01	6.426-07	3.360-01
60000	4.543-01	4.267-07	1.003-01	5.306-07	3.540-01
80000	4.634-01	2.303-07	7.905-02	3.923-07	3.844-01
100000	4.753-01	1.401-07	6.559-02	3.103-07	4.097-01

TABLE III. CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 9 FLUORINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.793+05	5.122+01	1.469-01	1.792+05
1.5	6.422+04	4.826+01	3.388-01	6.417+04
2	2.974+04	4.467+01	5.950-01	2.969+04
3	9.549+03	3.694+01	1.180+00	9.511+03
4	4.135+03	2.988+01	1.757+00	4.103+03
5	2.129+03	2.414+01	2.247+00	2.103+03
6	1.229+03	1.970+01	2.660+00	1.206+03
8	5.112+02	1.372+01	3.276+00	4.942+02
10	2.584+02	1.015+01	3.652+00	2.446+02
15	7.674+01	5.745+00	4.230+00	6.677+01
20	3.457+01	3.785+00	4.516+00	2.627+01
30	1.375+01	2.013+00	4.754+00	6.985+00
40	8.769+00	1.243+00	4.804+00	2.722+00
50	6.924+00	8.405-01	4.772+00	1.312+00
60	6.033+00	6.052-01	4.704+00	7.236-01
80	5.170+00	3.545-01	4.531+00	2.844-01
100	4.723+00	2.329-01	4.351+00	1.387-01
150	4.098+00	1.066-01	3.953+00	3.832-02
200	3.712+00	6.060-02	3.636+00	1.567-02
300	3.203+00	2.710-02	3.171+00	4.592-03

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.861+00	1.520-02	2.844+00	1.976-03	
500	2.610+00	9.700-03	2.599+00	1.046-03	
600	2.412+00	6.700-03	2.405+00	6.304-04	
800	2.117+00	3.700-03	2.113+00	2.907-04	
1000	1.902+00	2.300-03	1.900+00	1.632-04	
1500	1.549+00	1.029-03	1.544+00	8.012-05	3.568-03
2000	1.332+00	5.806-04	1.317+00	4.837-05	1.457-02
3000	1.078+00	2.589-04	1.036+00	2.690-05	4.182-02
4000	9.328-01	1.459-04	8.640-01	1.862-05	6.860-02
5000	8.387-01	9.347-05	7.458-01	1.400-05	9.283-02
6000	7.700-01	6.495-05	6.591-01	1.133-05	1.108-01
8000	6.859-01	3.657-05	5.390-01	8.115-06	1.469-01
10000	6.421-01	2.341-05	4.589-01	6.265-06	1.831-01
15000	5.765-01	1.041-05	3.394-01	4.092-06	2.371-01
20000	5.572-01	5.866-06	2.723-01	3.024-06	2.849-01
30000	5.435-01	2.588-06	1.980-01	1.975-06	3.455-01
40000	5.426-01	1.436-06	1.572-01	1.460-06	3.854-01
50000	5.507-01	9.042-07	1.311-01	1.155-06	4.196-01
60000	5.547-01	6.165-07	1.129-01	9.534-07	4.418-01
80000	5.682-01	3.338-07	8.894-02	7.047-07	4.792-01
100000	5.843-01	2.035-07	7.379-02	5.574-07	5.105-01

Z= 10 NEON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.549+05	6.379+01	1.824-01	2.549+05
1.5	9.101+04	6.070+01	3.890-01	9.095+04
2	4.221+04	5.685+01	6.448-01	4.215+04
3	1.364+04	4.821+01	1.216+00	1.359+04
4	5.952+03	3.988+01	1.793+00	5.910+03
5	3.087+03	3.276+01	2.318+00	3.051+03
6	1.792+03	2.702+01	2.774+00	1.762+03
8	7.533+02	1.899+01	3.478+00	7.308+02
10	3.834+02	1.404+01	3.956+00	3.654+02
15	1.142+02	7.848+00	4.612+00	1.018+02
20	5.070+01	5.123+00	4.939+00	4.064+01
30	1.898+01	2.721+00	5.224+00	1.104+01
40	1.135+01	1.687+00	5.294+00	4.366+00
50	8.542+00	1.146+00	5.269+00	2.127+00
60	7.211+00	8.272-01	5.200+00	1.184+00
80	5.972+00	4.839-01	5.017+00	4.713-01
100	5.373+00	3.184-01	4.822+00	2.319-01
150	4.598+00	1.463-01	4.386+00	6.494-02
200	4.146+00	8.340-02	4.036+00	2.675-02
300	3.566+00	3.730-02	3.521+00	7.886-03

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.184+00	2.100-02	3.159+00	3.396-03	
500	2.902+00	1.340-02	2.887+00	1.795-03	
600	2.682+00	9.300-03	2.671+00	1.078-03	
800	2.353+00	5.100-03	2.348+00	4.935-04	
1000	2.114+00	3.300-03	2.111+00	2.747-04	
1500	1.721+00	1.476-03	1.715+00	1.348-04	4.416-03
2000	1.482+00	8.334-04	1.463+00	8.131-05	1.801-02
3000	1.203+00	3.716-04	1.151+00	4.517-05	5.162-02
4000	1.045+00	2.094-04	9.600-01	3.126-05	8.447-02
5000	9.431-01	1.342-04	8.286-01	2.349-05	1.142-01
6000	8.687-01	9.324-05	7.323-01	1.900-05	1.363-01
8000	7.792-01	5.250-05	5.988-01	1.360-05	1.803-01
10000	7.344-01	3.361-05	5.099-01	1.049-05	2.245-01
15000	6.673-01	1.495-05	3.771-01	6.852-06	2.902-01
20000	6.510-01	8.421-06	3.025-01	5.064-06	3.485-01
30000	6.421-01	3.721-06	2.200-01	3.306-06	4.221-01
40000	6.453-01	2.069-06	1.746-01	2.443-06	4.706-01
50000	6.578-01	1.302-06	1.457-01	1.932-06	5.121-01
60000	6.644-01	8.886-07	1.254-01	1.595-06	5.389-01
80000	6.830-01	4.822-07	9.882-02	1.179-06	5.842-01
100000	7.039-01	2.947-07	8.199-02	9.325-07	6.219-01

Z= 11 SODIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.795+04	7.376+01	4.636-01	2.787+04
1.5	1.235+05	6.840+01	7.506-01	1.235+05
2	5.980+04	6.341+01	1.003+00	5.974+04
3	2.024+04	5.457+01	1.509+00	2.018+04
4	9.036+03	4.646+01	2.022+00	8.988+03
5	4.747+03	3.918+01	2.510+00	4.706+03
6	2.778+03	3.298+01	2.955+00	2.742+03
8	1.175+03	2.373+01	3.687+00	1.148+03
10	5.979+02	1.770+01	4.218+00	5.760+02
15	1.755+02	9.928+00	4.973+00	1.606+02
20	7.574+01	6.472+00	5.348+00	6.392+01
30	2.636+01	3.457+00	5.679+00	1.722+01
40	1.470+01	2.170+00	5.772+00	6.762+00
50	1.052+01	1.490+00	5.756+00	3.274+00
60	8.588+00	1.086+00	5.689+00	1.813+00
80	6.849+00	6.346-01	5.498+00	7.167-01
100	6.060+00	4.193-01	5.290+00	3.510-01
150	5.110+00	1.941-01	4.818+00	9.779-02
200	4.587+00	1.110-01	4.435+00	4.028-02
300	3.933+00	4.980-02	3.871+00	1.195-02

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.507+00	2.800-02	3.474+00	5.201-03	
500	3.195+00	1.790-02	3.175+00	2.782-03	
600	2.952+00	1.240-02	2.938+00	1.693-03	
800	2.590+00	6.900-03	2.582+00	7.946-04	
1000	2.326+00	4.400-03	2.322+00	4.535-04	
1500	1.894+00	1.969-03	1.887+00	2.223-04	5.357-03
2000	1.633+00	1.111-03	1.610+00	1.341-04	2.183-02
3000	1.329+00	4.957-04	1.266+00	7.441-05	6.245-02
4000	1.158+00	2.793-04	1.056+00	5.147-05	1.020-01
5000	1.050+00	1.790-04	9.116-01	3.868-05	1.379-01
6000	9.701-01	1.244-04	8.056-01	3.127-05	1.643-01
8000	8.760-01	7.003-05	6.587-01	2.237-05	2.172-01
10000	8.310-01	4.484-05	5.609-01	1.725-05	2.700-01
15000	7.635-01	1.995-05	4.149-01	1.126-05	3.486-01
20000	7.510-01	1.123-05	3.328-01	8.319-06	4.182-01
30000	7.481-01	4.969-06	2.420-01	5.431-06	5.061-01
40000	7.561-01	2.760-06	1.921-01	4.013-06	5.640-01
50000	7.738-01	1.742-06	1.603-01	3.174-06	6.136-01
60000	7.834-01	1.190-06	1.380-01	2.620-06	6.454-01
80000	8.078-01	6.466-07	1.087-01	1.936-06	6.990-01
100000	8.339-01	3.961-07	9.019-02	1.531-06	7.437-01

Z= 12 MAGNESIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	4.011+04	8.719+01	5.939-01	4.002+04
1.5	1.580+05	7.985+01	1.001+00	1.579+05
2	7.858+04	7.287+01	1.321+00	7.850+04
3	2.746+04	6.166+01	1.842+00	2.739+04
4	1.249+04	5.282+01	2.319+00	1.244+04
5	6.643+03	4.525+01	2.772+00	6.595+03
6	3.921+03	3.873+01	3.195+00	3.879+03
8	1.677+03	2.857+01	3.924+00	1.644+03
10	8.582+02	2.157+01	4.487+00	8.321+02
15	2.523+02	1.218+01	5.330+00	2.348+02
20	1.077+02	7.940+00	5.753+00	9.405+01
30	3.590+01	4.263+00	6.129+00	2.550+01
40	1.900+01	2.708+00	6.243+00	1.005+01
50	1.300+01	1.884+00	6.237+00	4.874+00
60	1.026+01	1.390+00	6.174+00	2.702+00
80	7.856+00	8.105-01	5.976+00	1.070+00
100	6.817+00	5.375-01	5.756+00	5.244-01
150	5.645+00	2.507-01	5.248+00	1.463-01
200	5.038+00	1.438-01	4.834+00	6.036-02
300	4.304+00	6.480-02	4.221+00	1.797-02

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.833+00	3.650-02	3.788+00	7.844-03	
500	3.490+00	2.330-02	3.462+00	4.209-03	
600	3.223+00	1.610-02	3.205+00	2.569-03	
800	2.827+00	9.000-03	2.816+00	1.214-03	
1000	2.539+00	5.600-03	2.533+00	6.969-04	
1500	2.068+00	2.507-03	2.058+00	3.415-04	6.392-03
2000	1.784+00	1.415-03	1.756+00	2.059-04	2.602-02
3000	1.456+00	6.312-04	1.381+00	1.141-04	7.431-02
4000	1.274+00	3.557-04	1.152+00	7.892-05	1.212-01
5000	1.159+00	2.279-04	9.945-01	5.929-05	1.637-01
6000	1.074+00	1.584-04	8.788-01	4.792-05	1.950-01
8000	9.762-01	8.918-05	7.187-01	3.425-05	2.574-01
10000	9.317-01	5.710-05	6.119-01	2.639-05	3.197-01
15000	8.649-01	2.540-05	4.526-01	1.723-05	4.122-01
20000	8.572-01	1.430-05	3.630-01	1.273-05	4.941-01
30000	8.615-01	6.335-06	2.640-01	8.307-06	5.975-01
40000	8.752-01	3.520-06	2.096-01	6.137-06	6.656-01
50000	8.986-01	2.223-06	1.748-01	4.853-06	7.238-01
60000	9.116-01	1.520-06	1.505-01	4.006-06	7.610-01
80000	9.423-01	8.271-07	1.186-01	2.959-06	8.237-01
100000	9.743-01	5.078-07	9.839-02	2.340-06	8.759-01

TABLE III. CONT.

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 13 ALUMINUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	5.274+04	1.016+02	6.214-01	5.263+04
1.5	1.765+04	9.243+01	1.093+00	1.756+04
2	1.033+05	8.372+01	1.483+00	1.032+05
3	3.615+04	6.974+01	2.088+00	3.608+04
4	1.655+04	5.940+01	2.591+00	1.649+04
5	8.868+03	5.123+01	2.998+00	8.814+03
6	5.271+03	4.440+01	3.424+00	5.224+03
8	2.284+03	3.352+01	4.163+00	2.246+03
10	1.182+03	2.567+01	4.785+00	1.151+03
15	3.534+02	1.466+01	5.676+00	3.330+02
20	1.516+02	9.557+00	6.152+00	1.359+02
30	4.957+01	5.142+00	6.588+00	3.784+01
40	2.517+01	3.279+00	6.717+00	1.517+01
50	1.646+01	2.292+00	6.719+00	7.453+00
60	1.253+01	1.699+00	6.657+00	4.171+00
80	9.115+00	9.897-01	6.452+00	1.673+00
100	7.703+00	6.569-01	6.219+00	8.266-01
150	6.217+00	3.071-01	5.677+00	2.327-01
200	5.504+00	1.763-01	5.232+00	9.609-02
300	4.679+00	7.950-02	4.571+00	2.839-02

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	4.160+00	4.480-02	4.103+00	1.224-02	
500	3.785+00	2.860-02	3.750+00	6.477-03	
600	3.495+00	1.970-02	3.471+00	3.895-03	
800	3.064+00	1.100-02	3.051+00	1.787-03	
1000	2.751+00	6.900-03	2.743+00	9.970-04	
1500	2.240+00	3.089-03	2.229+00	4.883-04	7.520-03
2000	1.934+00	1.744-03	1.902+00	2.942-04	3.059-02
3000	1.584+00	7.780-04	1.496+00	1.629-04	8.722-02
4000	1.390+00	4.385-04	1.248+00	1.127-04	1.420-01
5000	1.269+00	2.809-04	1.077+00	8.462-05	1.918-01
6000	1.180+00	1.952-04	9.518-01	6.837-05	2.283-01
8000	1.079+00	1.099-04	7.783-01	4.883-05	3.010-01
10000	1.036+00	7.039-05	6.627-01	3.761-05	3.734-01
15000	9.713-01	3.131-05	4.901-01	2.454-05	4.811-01
20000	9.693-01	1.763-05	3.932-01	1.813-05	5.761-01
30000	9.821-01	7.817-06	2.859-01	1.183-05	6.961-01
40000	1.002+00	4.346-06	2.270-01	8.740-06	7.752-01
50000	1.032+00	2.746-06	1.893-01	6.911-06	8.428-01
60000	1.049+00	1.878-06	1.630-01	5.704-06	8.858-01
80000	1.087+00	1.024-06	1.284-01	4.214-06	9.581-01
100000	1.125+00	6.297-07	1.066-01	3.331-06	1.018+00

Z= 14 SILICON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	7.500+04	1.187+02	6.053-01	7.488+04
1.5	2.532+04	1.080+02	1.107+00	2.521+04
2	1.270+05	9.738+01	1.555+00	1.269+05
3	4.647+04	7.984+01	2.265+00	4.639+04
4	2.176+04	6.720+01	2.824+00	2.169+04
5	1.181+04	5.782+01	3.238+00	1.175+04
6	7.080+03	5.034+01	3.672+00	7.026+03
8	3.094+03	3.867+01	4.421+00	3.050+03
10	1.605+03	3.006+01	5.073+00	1.570+03
15	4.788+02	1.739+01	6.023+00	4.554+02
20	2.035+02	1.136+01	6.548+00	1.856+02
30	6.449+01	6.088+00	7.032+00	5.137+01
40	3.150+01	3.836+00	7.181+00	2.049+01
50	1.986+01	2.643+00	7.192+00	1.002+01
60	1.466+01	1.931+00	7.134+00	5.591+00
80	1.028+01	1.126+00	6.924+00	2.232+00
100	8.525+00	7.434-01	6.681+00	1.100+00
150	6.759+00	3.442-01	6.105+00	3.094-01
200	5.954+00	1.968-01	5.629+00	1.281-01
300	5.046+00	8.840-02	4.919+00	3.825-02

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	4.484+00	4.980-02	4.417+00	1.671-02	
500	4.079+00	3.180-02	4.038+00	8.970-03	
600	3.764+00	2.190-02	3.737+00	5.472-03	
800	3.300+00	1.220-02	3.285+00	2.581-03	
1000	2.963+00	7.700-03	2.954+00	1.480-03	
1500	2.414+00	3.448-03	2.401+00	7.240-04	8.770-03
2000	2.086+00	1.947-03	2.048+00	4.359-04	3.556-02
3000	1.713+00	8.685-04	1.611+00	2.415-04	1.012-01
4000	1.509+00	4.895-04	1.344+00	1.668-04	1.646-01
5000	1.382+00	3.136-04	1.160+00	1.251-04	2.221-01
6000	1.290+00	2.180-04	1.025+00	1.010-04	2.642-01
8000	1.186+00	1.227-04	8.382-01	7.213-05	3.479-01
10000	1.145+00	7.860-05	7.137-01	5.553-05	4.313-01
15000	1.083+00	3.496-05	5.279-01	3.623-05	5.553-01
20000	1.088+00	1.969-05	4.234-01	2.676-05	6.648-01
30000	1.111+00	8.735-06	3.079-01	1.746-05	8.029-01
40000	1.138+00	4.859-06	2.445-01	1.289-05	8.936-01
50000	1.175+00	3.072-06	2.039-01	1.019-05	9.710-01
60000	1.196+00	2.102-06	1.756-01	8.412-06	1.020+00
80000	1.241+00	1.147-06	1.383-01	6.213-06	1.103+00
100000	1.287+00	7.068-07	1.148-01	4.911-06	1.172+00

Z= 15 PHOSPHORUS

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.040+05	1.375+02	5.569-01	1.039+05
1.5	3.325+04	1.257+02	1.055+00	3.312+04
2	1.560+04	1.134+02	1.544+00	1.549+04
3	5.733+04	9.214+01	2.371+00	5.723+04
4	2.739+04	7.659+01	3.018+00	2.731+04
5	1.507+04	6.536+01	3.535+00	1.500+04
6	9.116+03	5.682+01	3.975+00	9.055+03
8	4.035+03	4.408+01	4.713+00	3.986+03
10	2.111+03	3.472+01	5.321+00	2.071+03
15	6.356+02	2.041+01	6.356+00	6.089+02
20	2.703+02	1.336+01	6.935+00	2.500+02
30	8.438+01	7.138+00	7.455+00	6.979+01
40	4.004+01	4.453+00	7.630+00	2.795+01
50	2.440+01	3.034+00	7.655+00	1.371+01
60	1.746+01	2.195+00	7.602+00	7.663+00
80	1.174+01	1.280+00	7.391+00	3.066+00
100	9.493+00	8.417-01	7.138+00	1.514+00
150	7.344+00	3.867-01	6.531+00	4.267-01
200	6.422+00	2.203-01	6.024+00	1.769-01
300	5.420+00	9.870-02	5.268+00	5.297-02

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	4.809+00	5.550-02	4.731+00	2.320-02	
500	4.373+00	3.550-02	4.325+00	1.248-02	
600	4.036+00	2.450-02	4.004+00	7.631-03	
800	3.537+00	1.360-02	3.519+00	3.616-03	
1000	3.175+00	8.500-03	3.165+00	2.082-03	
1500	2.587+00	3.807-03	2.572+00	1.017-03	1.012-02
2000	2.238+00	2.150-03	2.195+00	6.120-04	4.092-02
3000	1.844+00	9.591-04	1.726+00	3.392-04	1.162-01
4000	1.630+00	5.406-04	1.440+00	2.339-04	1.888-01
5000	1.498+00	3.464-04	1.243+00	1.754-04	2.546-01
6000	1.401+00	2.407-04	1.098+00	1.416-04	3.027-01
8000	1.297+00	1.356-04	8.982-01	1.010-04	3.982-01
10000	1.258+00	8.681-05	7.647-01	7.772-05	4.932-01
15000	1.200+00	3.861-05	5.656-01	5.069-05	6.348-01
20000	1.213+00	2.174-05	4.537-01	3.743-05	7.598-01
30000	1.247+00	9.654-06	3.300-01	2.441-05	9.171-01
40000	1.282+00	5.372-06	2.620-01	1.803-05	1.020+00
50000	1.326+00	3.398-06	2.185-01	1.425-05	1.108+00
60000	1.352+00	2.326-06	1.881-01	1.176-05	1.164+00
80000	1.406+00	1.270-06	1.482-01	8.683-06	1.258+00
100000	1.459+00	7.843-07	1.230-01	6.863-06	1.336+00

Z= 16 SULFUR

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.358+05	1.578+02	4.442-01	1.357+05
1.5	4.582+04	1.452+02	9.218-01	4.567+04
2	2.082+04	1.315+02	1.437+00	2.069+04
3	7.254+04	1.066+02	2.361+00	7.243+04
4	3.418+04	8.778+01	3.107+00	3.409+04
5	1.869+04	7.419+01	3.701+00	1.861+04
6	1.129+04	6.414+01	4.188+00	1.122+04
8	5.000+03	4.986+01	4.970+00	4.946+03
10	2.627+03	3.966+01	5.648+00	2.581+03
15	8.005+02	2.371+01	6.708+00	7.701+02
20	3.436+02	1.557+01	7.325+00	3.207+02
30	1.079+02	8.304+00	7.900+00	9.166+01
40	5.062+01	5.146+00	8.092+00	3.738+01
50	3.020+01	3.482+00	8.124+00	1.860+01
60	2.109+01	2.506+00	8.074+00	1.051+01
80	1.360+01	1.462+00	7.859+00	4.279+00
100	1.069+01	9.580-01	7.596+00	2.137+00
150	8.008+00	4.379-01	6.957+00	6.132-01
200	6.925+00	2.489-01	6.420+00	2.564-01
300	5.804+00	1.113-01	5.616+00	7.703-02

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	5.140+00	6.260-02	5.044+00	3.360-02	
500	4.670+00	3.990-02	4.612+00	1.794-02	
600	4.308+00	2.760-02	4.270+00	1.086-02	
800	3.773+00	1.530-02	3.753+00	5.038-03	
1000	3.387+00	9.600-03	3.375+00	2.836-03	
1500	2.760+00	4.300-03	2.743+00	1.384-03	1.158-02
2000	2.390+00	2.428-03	2.340+00	8.320-04	4.666-02
3000	1.975+00	1.084-03	1.841+00	4.614-04	1.323-01
4000	1.751+00	6.107-04	1.536+00	3.178-04	2.145-01
5000	1.616+00	3.914-04	1.325+00	2.380-04	2.894-01
6000	1.516+00	2.720-04	1.171+00	1.920-04	3.438-01
8000	1.410+00	1.532-04	9.579-01	1.369-04	4.518-01
10000	1.375+00	9.809-05	8.156-01	1.053-04	5.592-01
15000	1.323+00	4.363-05	6.032-01	6.868-05	7.195-01
20000	1.345+00	2.456-05	4.839-01	5.071-05	8.609-01
30000	1.391+00	1.091-05	3.519-01	3.306-05	1.039+00
40000	1.434+00	6.076-06	2.794-01	2.441-05	1.155+00
50000	1.487+00	3.845-06	2.330-01	1.929-05	1.254+00
60000	1.517+00	2.634-06	2.006-01	1.592-05	1.316+00
80000	1.580+00	1.438-06	1.581-01	1.175-05	1.422+00
100000	1.641+00	8.900-07	1.311-01	9.287-06	1.510+00

TABLE III. CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 17 CHLORINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.634+05	1.795+02	4.213-01	1.633+05	
1.5	5.906+04	1.663+02	8.899-01	5.890+04	
2	2.738+04	1.514+02	1.413+00	2.723+04	
3	8.433+04	1.231+02	2.390+00	8.420+04	
4	4.155+04	1.009+02	3.209+00	4.144+04	
5	2.337+04	8.451+01	3.869+00	2.328+04	
6	1.438+04	7.253+01	4.404+00	1.431+04	
8	6.523+03	5.615+01	5.236+00	6.461+03	
10	3.470+03	4.491+01	5.936+00	3.419+03	
15	1.070+03	2.731+01	7.047+00	1.036+03	
20	4.591+02	1.801+01	7.707+00	4.334+02	
30	1.417+02	9.618+00	8.326+00	1.238+02	
40	6.475+01	5.966+00	8.541+00	5.025+01	
50	3.750+01	4.038+00	8.584+00	2.488+01	
60	2.543+01	2.905+00	8.538+00	1.399+01	
80	1.567+01	1.696+00	8.322+00	5.647+00	
100	1.196+01	1.111+00	8.050+00	2.803+00	
150	8.683+00	5.077-01	7.380+00	7.952-01	
200	7.434+00	2.884-01	6.815+00	3.305-01	
300	6.192+00	1.290-01	5.964+00	9.897-02	
400	5.474+00	7.250-02	5.358+00	4.325-02	
500	4.968+00	4.630-02	4.899+00	2.320-02	
600	4.582+00	3.200-02	4.536+00	1.414-02	
800	4.012+00	1.780-02	3.988+00	6.656-03	
1000	3.601+00	1.110-02	3.586+00	3.808-03	
1500	2.935+00	4.973-03	2.915+00	1.857-03	1.314-02
2000	2.544+00	2.808-03	2.487+00	1.115-03	5.280-02
3000	2.107+00	1.253-03	1.956+00	6.187-04	1.494-01
4000	1.875+00	7.064-04	1.632+00	4.256-04	2.421-01
5000	1.735+00	4.527-04	1.408+00	3.184-04	3.263-01
6000	1.633+00	3.146-04	1.245+00	2.568-04	3.875-01
8000	1.527+00	1.772-04	1.018+00	1.830-04	5.088-01
10000	1.496+00	1.135-04	8.666-01	1.407-04	6.292-01
15000	1.450+00	5.046-05	6.410-01	9.175-05	8.093-01
20000	1.482+00	2.841-05	5.142-01	6.773-05	9.681-01
30000	1.542+00	1.263-05	3.739-01	4.415-05	1.168+00
40000	1.594+00	7.036-06	2.968-01	3.259-05	1.297+00
50000	1.655+00	4.452-06	2.476-01	2.575-05	1.408+00
60000	1.691+00	3.052-06	2.132-01	2.124-05	1.478+00
80000	1.764+00	1.667-06	1.680-01	1.568-05	1.596+00
100000	1.833+00	1.033-06	1.394-01	1.239-05	1.694+00

Z= 18 ARGON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.190+05	2.027+02	4.617-01	2.188+05	
1.5	7.453+04	1.889+02	9.335-01	7.434+04	
2	3.423+04	1.731+02	1.455+00	3.405+04	
3	1.124+04	1.417+02	2.453+00	1.110+04	
4	5.235+04	1.158+02	3.322+00	5.223+04	
5	2.919+04	9.647+01	4.039+00	2.909+04	
6	1.786+04	8.219+01	4.623+00	1.777+04	
8	8.040+03	6.311+01	5.511+00	7.972+03	
10	4.260+03	5.056+01	6.182+00	4.203+03	
15	1.308+03	3.120+01	7.352+00	1.270+03	
20	5.600+02	2.069+01	8.070+00	5.313+02	
30	1.720+02	1.108+01	8.748+00	1.522+02	
40	7.792+01	6.887+00	8.986+00	6.205+01	
50	4.455+01	4.667+00	9.040+00	3.084+01	
60	2.977+01	3.360+00	8.999+00	1.741+01	
80	1.782+01	1.964+00	8.780+00	7.073+00	
100	1.332+01	1.288+00	8.500+00	3.529+00	
150	9.403+00	5.884-01	7.803+00	1.012+00	
200	7.966+00	3.344-01	7.208+00	4.239-01	
300	6.589+00	1.495-01	6.311+00	1.283-01	
400	5.811+00	8.400-02	5.671+00	5.644-02	
500	5.270+00	5.370-02	5.186+00	3.042-02	
600	4.857+00	3.710-02	4.801+00	1.860-02	
800	4.251+00	2.060-02	4.222+00	8.800-03	
1000	3.815+00	1.290-02	3.797+00	5.049-03	
1500	3.109+00	5.780-03	3.086+00	2.459-03	1.481-02
2000	2.697+00	3.265-03	2.633+00	1.476-03	5.934-02
3000	2.241+00	1.457-03	2.071+00	8.192-04	1.676-01
4000	2.001+00	8.213-04	1.728+00	5.628-04	2.713-01
5000	1.858+00	5.262-04	1.491+00	4.206-04	3.655-01
6000	1.752+00	3.658-04	1.318+00	3.393-04	4.338-01
8000	1.647+00	2.060-04	1.078+00	2.416-04	5.691-01
10000	1.621+00	1.319-04	9.177-01	1.857-04	7.032-01
15000	1.583+00	5.867-05	6.788-01	1.210-04	9.043-01
20000	1.626+00	3.303-05	5.445-01	8.933-05	1.081+00
30000	1.700+00	1.469-05	3.959-01	5.822-05	1.304+00
40000	1.762+00	8.188-06	3.143-01	4.297-05	1.448+00
50000	1.833+00	5.181-06	2.622-01	3.395-05	1.571+00
60000	1.874+00	3.554-06	2.257-01	2.800-05	1.648+00
80000	1.957+00	1.942-06	1.779-01	2.067-05	1.779+00
100000	2.036+00	1.206-06	1.476-01	1.633-05	1.888+00

Z= 19 POTASSIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.653+05	2.189+02	7.655-01	2.651+05	
1.5	9.336+04	2.022+02	1.261+00	9.316+04	
2	4.363+04	1.858+02	1.751+00	4.344+04	
3	1.455+04	1.548+02	2.696+00	1.439+04	
4	5.944+04	1.282+02	3.544+00	5.931+04	
5	3.403+04	1.071+02	4.270+00	3.392+04	
6	2.121+04	9.115+01	4.878+00	2.111+04	
8	9.776+03	6.964+01	5.812+00	9.700+03	
10	5.253+03	5.585+01	6.504+00	5.190+03	
15	1.640+03	3.498+01	7.701+00	1.597+03	
20	7.057+02	2.341+01	8.451+00	6.738+02	
30	2.158+02	1.251+01	9.177+00	1.941+02	
40	9.635+01	7.735+00	9.435+00	7.918+01	
50	5.404+01	5.221+00	9.498+00	3.932+01	
60	3.538+01	3.750+00	9.461+00	2.217+01	
80	2.042+01	2.193+00	9.239+00	8.984+00	
100	1.486+01	1.434+00	8.951+00	4.473+00	
150	1.016+01	6.532-01	8.225+00	1.278+00	
200	8.507+00	3.706-01	7.601+00	5.351-01	
300	6.986+00	1.655-01	6.658+00	1.623-01	
400	6.149+00	9.300-02	5.984+00	7.182-02	
500	5.571+00	5.940-02	5.472+00	3.897-02	
600	5.132+00	4.110-02	5.067+00	2.401-02	
800	4.490+00	2.280-02	4.455+00	1.154-02	
1000	4.028+00	1.430-02	4.007+00	6.725-03	
1500	3.283+00	6.408-03	3.257+00	3.272-03	1.659-02
2000	2.851+00	3.620-03	2.779+00	1.962-03	6.627-02
3000	2.375+00	1.616-03	2.186+00	1.090-03	1.869-01
4000	2.127+00	9.107-04	1.824+00	7.478-04	3.020-01
5000	1.982+00	5.836-04	1.574+00	5.584-04	4.069-01
6000	1.875+00	4.056-04	1.391+00	4.502-04	4.827-01
8000	1.771+00	2.284-04	1.138+00	3.205-04	6.327-01
10000	1.750+00	1.463-04	9.685-01	2.462-04	7.813-01
15000	1.721+00	6.506-05	7.164-01	1.604-04	1.005+00
20000	1.776+00	3.663-05	5.746-01	1.184-04	1.201+00
30000	1.865+00	1.629-05	4.179-01	7.713-05	1.448+00
40000	1.938+00	9.087-06	3.318-01	5.692-05	1.606+00
50000	2.019+00	5.751-06	2.767-01	4.496-05	1.742+00
60000	2.066+00	3.947-06	2.383-01	3.708-05	1.828+00
80000	2.160+00	2.158-06	1.877-01	2.737-05	1.972+00
100000	2.248+00	1.341-06	1.557-01	2.162-05	2.092+00

Z= 20 CALCIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	3.294+05	2.404+02	9.496-01	3.292+05	
1.5	1.155+05	2.198+02	1.543+00	1.153+05	
2	5.392+04	2.006+02	2.051+00	5.372+04	
3	1.801+04	1.675+02	2.976+00	1.784+04	
4	8.150+03	1.401+02	3.804+00	8.006+03	
5	4.101+04	1.179+02	4.525+00	4.088+04	
6	2.530+04	1.005+02	5.145+00	2.520+04	
8	1.157+04	7.646+01	6.120+00	1.149+04	
10	6.215+03	6.123+01	6.837+00	6.147+03	
15	1.958+03	3.879+01	8.059+00	1.911+03	
20	8.527+02	2.623+01	8.835+00	8.177+02	
30	2.654+02	1.404+01	9.605+00	2.417+02	
40	1.192+02	8.658+00	9.884+00	1.007+02	
50	6.665+01	5.841+00	9.954+00	5.085+01	
60	4.317+01	4.195+00	9.920+00	2.906+01	
80	2.416+01	2.454+00	9.696+00	1.201+01	
100	1.707+01	1.605+00	9.400+00	6.061+00	
150	1.114+01	7.299-01	8.646+00	1.764+00	
200	9.150+00	4.138-01	7.994+00	7.429-01	
300	7.414+00	1.847-01	7.005+00	2.244-01	
400	6.498+00	1.038-01	6.296+00	9.795-02	
500	5.878+00	6.630-02	5.759+00	5.220-02	
600	5.410+00	4.580-02	5.333+00	3.154-02	
800	4.729+00	2.550-02	4.689+00	1.453-02	
1000	4.242+00	1.610-02	4.218+00	8.125-03	
1500	3.458+00	7.216-03	3.429+00	3.949-03	1.848-02
2000	3.006+00	4.076-03	2.926+00	2.367-03	7.360-02
3000	2.512+00	1.819-03	2.301+00	1.315-03	2.072-01
4000	2.256+00	1.026-03	1.920+00	9.013-04	3.346-01
5000	2.109+00	6.572-04	1.657+00	6.724-04	4.505-01
6000	2.000+00	4.568-04	1.464+00	5.419-04	5.342-01
8000	1.898+00	2.573-04	1.198+00	3.856-04	6.996-01
10000	1.883+00	1.648-04	1.020+00	2.961-04	8.633-01
15000	1.864+00	7.328-05	7.541-01	1.929-04	1.110+00
20000	1.932+00	4.125-05	6.049-01	1.423-04	1.327+00
30000	2.038+00	1.835-05	4.399-01	9.271-05	1.598+00
40000	2.122+00	1.024-05	3.492-01	6.840-05	1.773+00
50000	2.213+00	6.484-06	2.913-01	5.403-05	1.922+00
60000	2.267+00	4.451-06	2.508-01	4.456-05	2.016+00
80000	2.372+00	2.436-06	1.976-01	3.287-05	2.175+00
100000	2.470+00	1.515-06	1.639-01	2.597-05	2.306+00

TABLE III. CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 21 SCANDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	3.985+05	2.674+02	8.902-01	3.983+05
1.5	1.461+05	2.454+02	1.483+00	1.458+05
2	6.922+04	2.243+02	2.002+00	6.899+04
3	2.305+04	1.876+02	2.956+00	2.286+04
4	1.023+04	1.571+02	3.815+00	1.007+04
5	4.748+04	1.324+02	4.572+00	4.735+04
6	2.998+04	1.127+02	5.232+00	2.986+04
8	1.408+04	8.523+01	6.292+00	1.399+04
10	7.661+03	6.790+01	7.023+00	7.586+03
15	2.436+03	4.314+01	8.356+00	2.385+03
20	1.058+03	2.939+01	9.181+00	1.019+03
30	3.238+02	1.578+01	9.962+00	2.980+02
40	1.427+02	9.728+00	1.029+01	1.227+02
50	7.825+01	6.567+00	1.038+01	6.130+01
60	4.980+01	4.720+00	1.036+01	3.472+01
80	2.706+01	2.765+00	1.014+01	1.416+01
100	1.872+01	1.808+00	9.837+00	7.077+00
150	1.192+01	8.225-01	9.061+00	2.036+00
200	9.705+00	4.664-01	8.383+00	8.551-01
300	7.819+00	2.082-01	7.350+00	2.606-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	6.841+00	1.170-01	6.608+00	1.156-01	
500	6.183+00	7.470-02	6.045+00	6.288-02	
600	5.688+00	5.160-02	5.598+00	3.882-02	
800	4.970+00	2.870-02	4.923+00	1.871-02	
1000	4.457+00	1.810-02	4.428+00	1.093-02	
1500	3.634+00	8.114-03	3.600+00	5.306-03	2.051-02
2000	3.161+00	4.583-03	3.072+00	3.177-03	8.144-02
3000	2.648+00	2.046-03	2.416+00	1.762-03	2.286-01
4000	2.387+00	1.153-03	2.016+00	1.207-03	3.688-01
5000	2.237+00	7.391-04	1.740+00	8.998-04	4.956-01
6000	2.126+00	5.137-04	1.537+00	7.248-04	5.877-01
8000	2.028+00	2.893-04	1.257+00	5.152-04	7.697-01
10000	2.021+00	1.853-04	1.071+00	3.954-04	9.499-01
15000	2.012+00	8.240-05	7.918-01	2.575-04	1.220+00
20000	2.093+00	4.639-05	6.351-01	1.900-04	1.458+00
30000	2.217+00	2.064-05	4.619-01	1.237-04	1.755+00
40000	2.313+00	1.153-05	3.667-01	9.129-05	1.947+00
50000	2.416+00	7.299-06	3.058-01	7.210-05	2.110+00
60000	2.477+00	5.013-06	2.633-01	5.946-05	2.213+00
80000	2.594+00	2.745-06	2.075-01	4.387-05	2.387+00
100000	2.703+00	1.709-06	1.721-01	3.465-05	2.531+00

Z= 22 TITANIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	4.929+05	2.958+02	8.304-01	4.926+05
1.5	1.737+05	2.729+02	1.417+00	1.734+05
2	8.138+04	2.501+02	1.944+00	8.113+04
3	2.728+04	2.098+02	2.923+00	2.707+04
4	1.237+04	1.762+02	3.810+00	1.219+04
5	5.566+04	1.486+02	4.599+00	5.550+04
6	3.491+04	1.265+02	5.296+00	3.478+04
8	1.632+04	9.520+01	6.434+00	1.622+04
10	8.887+03	7.540+01	7.245+00	8.805+03
15	2.852+03	4.785+01	8.657+00	2.795+03
20	1.251+03	3.281+01	9.527+00	1.209+03
30	3.892+02	1.768+01	1.035+01	3.612+02
40	1.729+02	1.091+01	1.071+01	1.513+02
50	9.484+01	7.373+00	1.082+01	7.664+01
60	6.000+01	5.305+00	1.080+01	4.389+01
80	3.189+01	3.111+00	1.058+01	1.820+01
100	2.152+01	2.036+00	1.028+01	9.203+00
150	1.310+01	9.270-01	9.478+00	2.691+00
200	1.044+01	5.257-01	8.773+00	1.138+00
300	8.277+00	2.347-01	7.696+00	3.468-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	7.205+00	1.320-01	6.920+00	1.527-01	
500	6.497+00	8.420-02	6.331+00	8.207-02	
600	5.972+00	5.820-02	5.864+00	5.000-02	
800	5.213+00	3.240-02	5.157+00	2.342-02	
1000	4.673+00	2.040-02	4.639+00	1.329-02	
1500	3.810+00	9.145-03	3.771+00	6.443-03	2.267-02
2000	3.317+00	5.167-03	3.218+00	3.855-03	8.970-02
3000	2.787+00	2.307-03	2.531+00	2.135-03	2.511-01
4000	2.519+00	1.300-03	2.112+00	1.461-03	4.047-01
5000	2.367+00	8.333-04	1.823+00	1.088-03	5.428-01
6000	2.256+00	5.792-04	1.611+00	8.761-04	6.437-01
8000	2.161+00	3.262-04	1.317+00	6.222-04	8.431-01
10000	2.163+00	2.089-04	1.122+00	4.771-04	1.040+00
15000	2.166+00	9.291-05	8.296-01	3.107-04	1.336+00
20000	2.261+00	5.230-05	6.654-01	2.292-04	1.595+00
30000	2.403+00	2.328-05	4.839-01	1.493-04	1.919+00
40000	2.512+00	1.301-05	3.842-01	1.101-04	2.128+00
50000	2.627+00	8.237-06	3.204-01	8.698-05	2.306+00
60000	2.695+00	5.659-06	2.759-01	7.173-05	2.419+00
80000	2.826+00	3.100-06	2.174-01	5.291-05	2.608+00
100000	2.946+00	1.931-06	1.804-01	4.179-05	2.766+00

Z= 23 VANADIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	5.692+05	3.257+02	7.712-01	5.689+05
1.5	2.034+05	3.018+02	1.345+00	2.031+05
2	9.599+04	2.777+02	1.879+00	9.571+04
3	3.242+04	2.340+02	2.879+00	3.218+04
4	1.474+04	1.971+02	3.793+00	1.454+04
5	7.926+03	1.665+02	4.611+00	7.755+03
6	4.140+04	1.418+02	5.340+00	4.125+04
8	1.909+04	1.064+02	6.549+00	1.898+04
10	1.032+04	8.381+01	7.447+00	1.023+04
15	3.292+03	5.297+01	8.943+00	3.230+03
20	1.444+03	3.649+01	9.863+00	1.398+03
30	4.506+02	1.977+01	1.074+01	4.201+02
40	2.005+02	1.222+01	1.114+01	1.771+02
50	1.098+02	8.266+00	1.126+01	9.028+01
60	6.919+01	5.953+00	1.125+01	5.198+01
80	3.627+01	3.496+00	1.103+01	2.174+01
100	2.408+01	2.290+00	1.072+01	1.107+01
150	1.421+01	1.044+00	9.895+00	3.273+00
200	1.115+01	5.922-01	9.163+00	1.393+00
300	8.732+00	2.645-01	8.041+00	4.263-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	7.568+00	1.488-01	7.232+00	1.875-01	
500	6.813+00	9.500-02	6.617+00	1.005-01	
600	6.256+00	6.570-02	6.129+00	6.095-02	
800	5.456+00	3.650-02	5.391+00	2.823-02	
1000	4.888+00	2.310-02	4.849+00	1.583-02	
1500	3.985+00	1.036-02	3.942+00	7.665-03	2.494-02
2000	3.473+00	5.852-03	3.364+00	4.582-03	9.839-02
3000	2.926+00	2.612-03	2.646+00	2.534-03	2.747-01
4000	2.653+00	1.473-03	2.208+00	1.732-03	4.423-01
5000	2.500+00	9.439-04	1.905+00	1.290-03	5.920-01
6000	2.388+00	6.561-04	1.684+00	1.038-03	7.021-01
8000	2.298+00	3.695-04	1.377+00	7.362-04	9.198-01
10000	2.308+00	2.366-04	1.172+00	5.641-04	1.135+00
15000	2.324+00	1.053-04	8.672-01	3.673-04	1.456+00
20000	2.435+00	5.924-05	6.956-01	2.710-04	1.739+00
30000	2.596+00	2.637-05	5.059-01	1.765-04	2.090+00
40000	2.719+00	1.474-05	4.016-01	1.302-04	2.317+00
50000	2.846+00	9.338-06	3.350-01	1.028-04	2.511+00
60000	2.922+00	6.417-06	2.884-01	8.477-05	2.634+00
80000	3.067+00	3.517-06	2.272-01	6.253-05	2.839+00
100000	3.198+00	2.193-06	1.885-01	4.938-05	3.010+00

Z= 24 CHROMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	6.761+05	3.594+02	7.136-01	6.757+05
1.5	2.400+05	3.368+02	1.271+00	2.396+05
2	1.129+05	3.126+02	1.809+00	1.125+05
3	3.796+04	2.661+02	2.827+00	3.769+04
4	1.722+04	2.246+02	3.764+00	1.699+04
5	9.249+03	1.896+02	4.608+00	9.055+03
6	4.737+04	1.612+02	5.364+00	4.720+04
8	2.208+04	1.203+02	6.637+00	2.196+04
10	1.203+04	9.415+01	7.618+00	1.193+04
15	3.882+03	5.899+01	9.219+00	3.814+03
20	1.714+03	4.069+01	1.018+01	1.663+03
30	5.375+02	2.214+01	1.099+01	5.044+02
40	2.390+02	1.371+01	1.147+01	2.138+02
50	1.303+02	9.285+00	1.164+01	1.094+02
60	8.146+01	6.692+00	1.164+01	6.313+01
80	4.187+01	3.934+00	1.144+01	2.649+01
100	2.723+01	2.580+00	1.114+01	1.352+01
150	1.548+01	1.177+00	1.030+01	4.004+00
200	1.192+01	6.682-01	9.547+00	1.704+00
300	9.204+00	2.987-01	8.384+00	5.214-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	7.940+00	1.680-01	7.543+00	2.291-01	
500	7.132+00	1.073-01	6.902+00	1.226-01	
600	6.542+00	7.420-02	6.394+00	7.421-02	
800	5.699+00	4.130-02	5.624+00	3.427-02	
1000	5.104+00	2.600-02	5.059+00	1.916-02	
1500	4.161+00	1.166-02	4.113+00	9.266-03	2.734-02
2000	3.629+00	6.587-03	3.510+00	5.534-03	1.075-01
3000	3.066+00	2.941-03	2.761+00	3.057-03	2.993-01
4000	2.789+00	1.658-03	2.303+00	2.088-03	4.815-01
5000	2.634+00	1.063-03	1.988+00	1.553-03	6.433-01
6000	2.522+00	7.387-04	1.757+00	1.249-03	7.630-01
8000	2.438+00	4.160-04	1.437+00	8.851-04	9.957-01
10000	2.458+00	2.664-04	1.223+00	6.777-04	1.234+00
15000	2.487+00	1.185-04	9.048-01	4.413-04	1.582+00
20000	2.614+00	6.670-05	7.258-01	3.255-04	1.888+00
30000	2.795+00	2.969-05	5.278-01	2.120-04	2.267+00
40000	2.933+00	1.660-05	4.191-01	1.564-04	2.514+00
50000	3.074+00	1.052-05	3.495-01	1.235-04	2.724+00
60000	3.158+00	7.232-06	3.009-01	1.018-04	2.856+00
80000	3.316+00	3.967-06	2.371-01	7.510-05	3.079+00
100000	3.461+00	2.474-06	1.967-01	5.931-05	3.264+00

TABLE III, CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 25 MANGANESE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	7.875+05	3.894+02	8.108-01	7.871+05
1.5	2.813+05	3.642+02	1.428+00	2.810+05
2	1.328+05	3.376+02	1.984+00	1.325+05
3	4.484+04	2.877+02	2.986+00	4.455+04
4	2.038+04	2.443+02	3.908+00	2.013+04
5	1.095+04	2.075+02	4.746+00	1.074+04
6	6.562+03	1.772+02	5.502+00	6.380+03
8	2.520+04	1.327+02	6.793+00	2.507+04
10	1.377+04	1.036+02	7.812+00	1.366+04
15	4.460+03	6.461+01	9.497+00	4.386+03
20	1.974+03	4.473+01	1.052+01	1.919+03
30	6.208+02	2.451+01	1.160+01	5.847+02
40	2.759+02	1.523+01	1.204+01	2.486+02
50	1.500+02	1.033+01	1.218+01	1.275+02
60	9.340+01	7.456+00	1.217+01	7.377+01
80	4.740+01	4.390+00	1.194+01	3.107+01
100	3.040+01	2.883+00	1.161+01	1.590+01
150	1.679+01	1.318+00	1.074+01	4.739+00
200	1.272+01	7.482-01	9.948+00	2.027+00
300	9.694+00	3.348-01	8.734+00	6.248-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	8.322+00	1.884-01	7.858+00	2.762-01	
500	7.459+00	1.203-01	7.190+00	1.486-01	
600	6.834+00	8.320-02	6.660+00	9.037-02	
800	5.947+00	4.640-02	5.858+00	4.206-02	
1000	5.323+00	2.930-02	5.270+00	2.367-02	
1500	4.339+00	1.314-02	4.285+00	1.143-02	2.986-02
2000	3.788+00	7.425-03	3.656+00	6.823-03	1.171-01
3000	3.208+00	3.315-03	2.876+00	3.763-03	3.251-01
4000	2.926+00	1.869-03	2.400+00	2.568-03	5.223-01
5000	2.771+00	1.198-03	2.071+00	1.909-03	6.966-01
6000	2.659+00	8.327-04	1.830+00	1.534-03	8.264-01
8000	2.581+00	4.689-04	1.497+00	1.086-03	1.083+00
10000	2.612+00	3.003-04	1.274+00	8.312-04	1.337+00
15000	2.656+00	1.336-04	9.427-01	5.412-04	1.713+00
20000	2.799+00	7.519-05	7.561-01	3.992-04	2.043+00
30000	3.002+00	3.347-05	5.499-01	2.599-04	2.452+00
40000	3.155+00	1.873-05	4.366-01	1.917-04	2.718+00
50000	3.309+00	1.187-05	3.641-01	1.514-04	2.945+00
60000	3.402+00	8.161-06	3.135-01	1.248-04	3.088+00
80000	3.575+00	4.478-06	2.470-01	9.206-05	3.328+00
100000	3.732+06	2.795-06	2.049-01	7.270-05	3.527+00

Z= 26 IRON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	8.647+05	4.232+02	7.430-01	8.643+05
1.5	3.207+05	3.976+02	1.332+00	3.203+05
2	1.545+05	3.699+02	1.883+00	1.541+05
3	5.319+04	3.170+02	2.908+00	5.287+04
4	2.435+04	2.705+02	3.860+00	2.408+04
5	1.311+04	2.306+02	4.722+00	1.288+04
6	7.849+03	1.973+02	5.503+00	7.646+03
8	2.861+04	1.478+02	6.849+00	2.845+04
10	1.603+04	1.151+02	7.886+00	1.591+04
15	5.347+03	7.125+01	9.699+00	5.266+03
20	2.388+03	4.933+01	1.080+01	2.327+03
30	7.499+02	2.718+01	1.191+01	7.108+02
40	3.300+02	1.695+01	1.241+01	3.007+02
50	1.772+02	1.152+01	1.258+01	1.531+02
60	1.089+02	8.322+00	1.258+01	8.795+01
80	5.384+01	4.905+00	1.237+01	3.657+01
100	3.378+01	3.226+00	1.204+01	1.852+01
150	1.805+01	1.477+00	1.115+01	5.420+00
200	1.346+01	8.400-01	1.033+01	2.295+00
300	1.015+01	3.758-01	9.077+00	7.021-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	8.691+00	2.115-01	8.169+00	3.108-01	
500	7.779+00	1.351-01	7.476+00	1.682-01	
600	7.122+00	9.350-02	6.925+00	1.032-01	
800	6.193+00	5.210-02	6.092+00	4.907-02	
1000	5.541+00	3.290-02	5.480+00	2.828-02	
1500	4.517+00	1.476-02	4.456+00	1.364-02	3.252-02
2000	3.946+00	8.338-03	3.802+00	8.135-03	1.271-01
3000	3.351+00	3.723-03	2.991+00	4.481-03	3.519-01
4000	3.066+00	2.099-03	2.496+00	3.055-03	5.650-01
5000	2.910+00	1.346-03	2.154+00	2.270-03	7.520-01
6000	2.799+00	9.352-04	1.904+00	1.823-03	8.921-01
8000	2.728+00	5.267-04	1.557+00	1.290-03	1.169+00
10000	2.770+00	3.374-04	1.325+00	9.859-04	1.443+00
15000	2.829+00	1.500-04	9.803-01	6.419-04	1.848+00
20000	2.991+00	8.446-05	7.864-01	4.734-04	2.204+00
30000	3.215+00	3.760-05	5.719-01	3.082-04	2.643+00
40000	3.384+00	2.104-05	4.540-01	2.273-04	2.930+00
50000	3.553+00	1.334-05	3.787-01	1.795-04	3.174+00
60000	3.654+00	9.175-06	3.260-01	1.480-04	3.328+00
80000	3.843+00	5.037-06	2.569-01	1.092-04	3.586+00
100000	4.014+00	3.145-06	2.131-01	8.620-05	3.800+00

Z= 27 COBALT

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.056+06	4.584+02	6.882-01	1.056+06
1.5	3.771+05	4.323+02	1.253+00	3.767+05
2	1.786+05	4.036+02	1.799+00	1.782+05
3	6.089+04	3.480+02	2.840+00	6.054+04
4	2.796+04	2.983+02	3.814+00	2.766+04
5	1.518+04	2.553+02	4.697+00	1.492+04
6	9.172+03	2.189+02	5.500+00	8.948+03
8	3.358+04	1.643+02	6.896+00	3.341+04
10	1.864+04	1.277+02	8.002+00	1.851+04
15	6.147+03	7.850+01	9.922+00	6.058+03
20	2.731+03	5.430+01	1.109+01	2.666+03
30	8.547+02	3.007+01	1.228+01	8.124+02
40	3.757+02	1.882+01	1.282+01	3.441+02
50	2.015+02	1.282+01	1.301+01	1.756+02
60	1.234+02	9.275+00	1.302+01	1.011+02
80	6.057+01	5.472+00	1.281+01	4.228+01
100	3.760+01	3.603+00	1.248+01	2.152+01
150	1.958+01	1.654+00	1.156+01	6.370+00
200	1.438+01	9.410-01	1.072+01	2.721+00
300	1.069+01	4.214-01	9.423+00	8.434-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	9.094+00	2.372-01	8.480+00	3.770-01	
500	8.119+00	1.516-01	7.762+00	2.055-01	
600	7.422+00	1.049-01	7.190+00	1.268-01	
800	6.444+00	5.850-02	6.325+00	6.083-02	
1000	5.763+00	3.700-02	5.691+00	3.527-02	
1500	4.696+00	1.660-02	4.627+00	1.700-02	3.533-02
2000	4.106+00	9.379-03	3.949+00	1.013-02	1.375-01
3000	3.496+00	4.188-03	3.106+00	5.566-03	3.799-01
4000	3.207+00	2.362-03	2.592+00	3.797-03	6.093-01
5000	3.052+00	1.514-03	2.237+00	2.822-03	8.106-01
6000	2.942+00	1.052-03	1.977+00	2.265-03	9.612-01
8000	2.878+00	5.925-04	1.617+00	1.602-03	1.259+00
10000	2.931+00	3.795-04	1.377+00	1.224-03	1.553+00
15000	3.007+00	1.688-04	1.018+00	7.970-04	1.988+00
20000	3.187+00	9.502-05	8.167-01	5.876-04	2.369+00
30000	3.439+00	4.230-05	5.939-01	3.825-04	2.844+00
40000	3.624+00	2.368-05	4.715-01	2.820-04	3.152+00
50000	3.807+00	1.502-05	3.933-01	2.227-04	3.414+00
60000	3.918+00	1.033-05	3.386-01	1.836-04	3.579+00
80000	4.123+00	5.674-06	2.668-01	1.353-04	3.856+00
100000	4.307+00	3.544-06	2.214-01	1.068-04	4.085+00

Z= 28 NICKEL

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.022+06	4.950+02	6.437-01	1.021+06
1.5	4.274+05	4.684+02	1.188+00	4.269+05
2	2.038+05	4.389+02	1.730+00	2.033+05
3	7.010+04	3.806+02	2.779+00	6.971+04
4	3.238+04	3.279+02	3.769+00	3.205+04
5	1.765+04	2.816+02	4.671+00	1.736+04
6	1.070+04	2.422+02	5.494+00	1.045+04
8	4.827+03	1.822+02	6.936+00	4.638+03
10	2.054+04	1.416+02	8.117+00	2.039+04
15	6.997+03	8.642+01	1.014+01	6.900+03
20	3.154+03	5.966+01	1.137+01	3.083+03
30	9.968+02	3.318+01	1.265+01	9.510+02
40	4.381+02	2.086+01	1.323+01	4.040+02
50	2.338+02	1.425+01	1.344+01	2.062+02
60	1.423+02	1.032+01	1.346+01	1.186+02
80	6.871+01	6.094+00	1.326+01	4.935+01
100	4.194+01	4.019+00	1.291+01	2.501+01
150	2.117+01	1.848+00	1.198+01	7.339+00
200	1.528+01	1.053+00	1.111+01	3.116+00
300	1.120+01	4.720-01	9.767+00	9.608-01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	9.487+00	2.657-01	8.792+00	4.291-01	
500	8.452+00	1.698-01	8.048+00	2.343-01	
600	7.718+00	1.175-01	7.455+00	1.451-01	
800	6.695+00	6.550-02	6.559+00	7.024-02	
1000	5.984+00	4.150-02	5.901+00	4.119-02	
1500	4.875+00	1.862-02	4.798+00	1.984-02	3.828-02
2000	4.266+00	1.052-02	4.095+00	1.182-02	1.484-01
3000	3.641+00	4.699-03	3.221+00	6.475-03	4.091-01
4000	3.350+00	2.649-03	2.688+00	4.418-03	6.553-01
5000	3.196+00	1.698-03	2.320+00	3.284-03	8.715-01
6000	3.087+00	1.180-03	2.050+00	2.636-03	1.033+00
8000	3.030+00	6.648-04	1.676+00	1.864-03	1.351+00
10000	3.095+00	4.258-04	1.427+00	1.424-03	1.666+00
15000	3.189+00	1.894-04	1.056+00	9.265-04	2.132+00
20000	3.388+00	1.066-04	8.469-01	6.830-04	2.540+00
30000	3.669+00	4.746-05	6.159-01	4.444-04	3.053+00
40000	3.871+00	2.658-05	4.890-01	3.276-04	3.382+00
50000	4.070+00	1.686-05	4.078-01	2.586-04	3.662+00
60000	4.190+00	1.160-05	3.512-01	2.132-04	3.838+00
80000	4.411+00	6.375-06	2.767-01	1.571-04	4.135+00
100000	4.610+00	3.981-06	2.295-01	1.240-04	4.380+00

Z= 29 COPPER

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.324+06	5.354+02	6.072-01	1.323+06
1.5	5.324+05	5.106+02	1.134+00	5.319+05
2	2.479+05	4.821+02	1.672+00	2.474+05
3	8.301+04	4.227+02	2.726+00	8.258+04
4	3.778+04	3.661+02	3.725+00	3.741+04
5	2.041+04	3.151+02	4.643+00	2.009+04
6	1.230+04	2.713+02	5.486+00	1.203+04
8	5.515+03	2.040+02	6.969+00	5.305+03
10	2.314+04	1.582+02	8.203+00	2.297+04
15	7.891+03	9.585+01	1.034+01	7.785+03
20	3.574+03	6.589+01	1.165+01	3.497+03
30	1.141+03	3.670+01	1.305+01	1.091+03
40	5.051+02	2.316+01	1.366+01	4.683+02
50	2.707+02	1.585+01	1.388+01	2.410+02
60	1.650+02	1.150+01	1.391+01	1.396+02
80	7.921+01	6.791+00	1.370+01	5.872+01
100	4.782+01	4.484+00	1.335+01	2.998+01
150	2.335+01	2.066+00	1.239+01	8.892+00
200	1.647+01	1.178+00	1.150+01	3.793+00
300	1.181+01	5.290-01	1.011+01	1.169+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	9.920+00	2.976-01	9.104+00	5.192-01	
500	8.805+00	1.903-01	8.333+00	2.812-01	
600	8.025+00	1.318-01	7.721+00	1.725-01	
800	6.948+00	7.350-02	6.793+00	8.187-02	
1000	6.205+00	4.650-02	6.111+00	4.703-02	
1500	5.054+00	2.086-02	4.969+00	2.264-02	4.138-02
2000	4.426+00	1.179-02	4.241+00	1.348-02	1.598-01
3000	3.788+00	5.266-03	3.336+00	7.365-03	4.393-01
4000	3.495+00	2.969-03	2.784+00	5.026-03	7.031-01
5000	3.343+00	1.903-03	2.403+00	3.737-03	9.345-01
6000	3.235+00	1.323-03	2.123+00	2.999-03	1.107+00
8000	3.186+00	7.451-04	1.736+00	2.119-03	1.447+00
10000	3.264+00	4.772-04	1.478+00	1.619-03	1.783+00
15000	3.376+00	2.123-04	1.094+00	1.053-03	2.281+00
20000	3.595+00	1.195-04	8.771-01	7.762-04	2.717+00
30000	3.907+00	5.319-05	6.379-01	5.049-04	3.269+00
40000	4.127+00	2.981-05	5.064-01	3.721-04	3.620+00
50000	4.341+00	1.891-05	4.224-01	2.937-04	3.918+00
60000	4.470+00	1.301-05	3.637-01	2.420-04	4.107+00
80000	4.709+00	7.154-06	2.866-01	1.784-04	4.423+00
100000	4.922+00	4.468-06	2.377-01	1.408-04	4.684+00

Z= 30 ZINC

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.733+05	5.720+02	6.919-01	1.728+05
1.5	5.708+05	5.448+02	1.276+00	5.703+05
2	2.664+05	5.137+02	1.834+00	2.658+05
3	9.045+04	4.504+02	2.863+00	9.000+04
4	4.191+04	3.918+02	3.834+00	4.151+04
5	2.305+04	3.392+02	4.743+00	2.271+04
6	1.415+04	2.936+02	5.585+00	1.385+04
8	6.549+03	2.224+02	7.072+00	6.320+03
10	2.643+04	1.729+02	8.323+00	2.625+04
15	9.114+03	1.044+02	1.054+01	8.999+03
20	4.140+03	7.169+01	1.191+01	4.056+03
30	1.320+03	4.011+01	1.339+01	1.266+03
40	5.815+02	2.545+01	1.404+01	5.420+02
50	3.100+02	1.748+01	1.429+01	2.782+02
60	1.878+02	1.271+01	1.433+01	1.607+02
80	8.898+01	7.510+00	1.413+01	6.734+01
100	5.304+01	4.967+00	1.378+01	3.429+01
150	2.524+01	2.295+00	1.281+01	1.014+01
200	1.752+01	1.310+00	1.189+01	4.324+00
300	1.238+01	5.880-01	1.046+01	1.340+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.035+01	3.313-01	9.415+00	5.999-01	
500	9.159+00	2.118-01	8.619+00	3.281-01	
600	8.335+00	1.467-01	7.985+00	2.033-01	
800	7.207+00	8.190-02	7.026+00	9.845-02	
1000	6.431+00	5.190-02	6.321+00	5.771-02	
1500	5.236+00	2.329-02	5.140+00	2.777-02	4.472-02
2000	4.588+00	1.316-02	4.387+00	1.652-02	1.718-01
3000	3.937+00	5.879-03	3.451+00	9.020-03	4.709-01
4000	3.642+00	3.315-03	2.880+00	6.152-03	7.526-01
5000	3.492+00	2.125-03	2.485+00	4.572-03	9.997-01
6000	3.385+00	1.477-03	2.197+00	3.667-03	1.184+00
8000	3.346+00	8.318-04	1.796+00	2.590-03	1.546+00
10000	3.435+00	5.328-04	1.529+00	1.978-03	1.904+00
15000	3.567+00	2.370-04	1.131+00	1.286-03	2.434+00
20000	3.807+00	1.334-04	9.074-01	9.478-04	2.899+00
30000	4.148+00	5.939-05	6.599-01	6.164-04	3.487+00
40000	4.386+00	3.329-05	5.239-01	4.542-04	3.861+00
50000	4.616+00	2.112-05	4.370-01	3.584-04	4.179+00
60000	4.756+00	1.453-05	3.762-01	2.953-04	4.379+00
80000	5.012+00	7.996-06	2.964-01	2.176-04	4.716+00
100000	5.240+00	4.994-06	2.459-01	1.717-04	4.994+00

Z= 31 GALLIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.127+05	6.073+02	7.217-01	2.121+05
1.5	6.843+05	5.762+02	1.335+00	6.837+05
2	3.216+05	5.421+02	1.921+00	3.210+05
3	1.088+05	4.757+02	2.985+00	1.083+05
4	4.975+04	4.154+02	3.966+00	4.933+04
5	2.695+04	3.617+02	4.876+00	2.658+04
6	1.627+04	3.149+02	5.716+00	1.595+04
8	7.296+03	2.406+02	7.207+00	7.049+03
10	3.906+03	1.877+02	8.498+00	3.710+03
15	9.848+03	1.133+02	1.076+01	9.724+03
20	4.579+03	7.766+01	1.218+01	4.489+03
30	1.498+03	4.368+01	1.373+01	1.430+03
40	6.589+02	2.793+01	1.443+01	6.165+02
50	3.511+02	1.931+01	1.470+01	3.171+02
60	2.120+02	1.410+01	1.476+01	1.832+02
80	9.948+01	8.330+00	1.456+01	7.659+01
100	5.863+01	5.523+00	1.421+01	3.889+01
150	2.722+01	2.562+00	1.322+01	1.144+01
200	1.861+01	1.465+00	1.227+01	4.871+00
300	1.296+01	6.580-01	1.079+01	1.513+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.078+01	3.710-01	9.726+00	6.824-01	
500	9.518+00	2.374-01	8.904+00	3.769-01	
600	8.650+00	1.643-01	8.250+00	2.362-01	
800	7.469+00	9.180-02	7.260+00	1.172-01	
1000	6.661+00	5.820-02	6.532+00	7.049-02	
1500	5.420+00	2.612-02	5.312+00	3.390-02	4.821-02
2000	4.753+00	1.476-02	4.534+00	2.017-02	1.844-01
3000	4.088+00	6.594-03	3.567+00	1.100-02	5.037-01
4000	3.791+00	3.718-03	2.976+00	7.495-03	8.037-01
5000	3.644+00	2.383-03	2.569+00	5.567-03	1.067+00
6000	3.539+00	1.657-03	2.270+00	4.464-03	1.263+00
8000	3.509+00	9.331-04	1.856+00	3.151-03	1.648+00
10000	3.611+00	5.976-04	1.581+00	2.406-03	2.028+00
15000	3.763+00	2.658-04	1.169+00	1.564-03	2.592+00
20000	4.025+00	1.496-04	9.378-01	1.152-03	3.086+00
30000	4.395+00	6.661-05	6.820-01	7.490-04	3.712+00
40000	4.652+00	3.736-05	5.414-01	5.518-04	4.110+00
50000	4.900+00	2.371-05	4.516-01	4.354-04	4.447+00
60000	5.050+00	1.631-05	3.888-01	3.587-04	4.660+00
80000	5.324+00	8.979-06	3.064-01	2.643-04	5.017+00
100000	5.567+00	5.609-06	2.542-01	2.085-04	5.313+00

Z= 32 GERMANIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.467+05	6.466+02	7.257-01	2.461+05
1.5	7.955+05	6.125+02	1.356+00	7.949+05
2	3.645+05	5.750+02	1.972+00	3.639+05
3	1.208+05	5.028+02	3.090+00	1.203+05
4	5.506+04	4.395+02	4.099+00	5.462+04
5	2.992+04	3.841+02	5.019+00	2.954+04
6	1.819+04	3.360+02	5.864+00	1.784+04
8	8.301+03	2.589+02	7.360+00	8.035+03
10	4.529+03	2.029+02	8.684+00	4.317+03
15	1.091+04	1.226+02	1.099+01	1.078+04
20	5.061+03	8.387+01	1.246+01	4.964+03
30	1.644+03	4.734+01	1.408+01	1.583+03
40	7.297+02	3.045+01	1.482+01	6.844+02
50	3.894+02	2.115+01	1.511+01	3.532+02
60	2.353+02	1.550+01	1.518+01	2.047+02
80	1.102+02	9.152+00	1.499+01	8.607+01
100	6.464+01	6.078+00	1.464+01	4.392+01
150	2.949+01	2.827+00	1.363+01	1.304+01
200	1.986+01	1.619+00	1.266+01	5.583+00
300	1.359+01	7.280-01	1.111+01	1.747+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.124+01	4.110-01	1.004+01	7.909-01	
500	9.890+00	2.628-01	9.190+00	4.376-01	
600	8.971+00	1.819-01	8.515+00	2.744-01	
800	7.728+00	1.017-01	7.490+00	1.361-01	
1000	6.888+00	6.440-02	6.742+00	8.163-02	
1500	5.603+00	2.890-02	5.483+00	3.924-02	5.187-02
2000	4.917+00	1.634-02	4.680+00	2.333-02	1.974-01
3000	4.239+00	7.297-03	3.681+00	1.271-02	5.376-01
4000	3.941+00	4.115-03	3.072+00	8.657-03	8.566-01
5000	3.797+00	2.638-03	2.651+00	6.427-03	1.137+00
6000	3.695+00	1.834-03	2.343+00	5.152-03	1.344+00
8000	3.674+00	1.033-03	1.916+00	3.635-03	1.753+00
10000	3.790+00	6.615-04	1.632+00	2.773-03	2.155+00
15000	3.963+00	2.942-04	1.207+00	1.803-03	2.755+00
20000	4.248+00	1.656-04	9.680-01	1.328-03	3.279+00
30000	4.649+00	7.373-05	7.040-01	8.630-04	3.944+00
40000	4.925+00	4.137-05	5.589-01	6.357-04	4.365+00
50000	5.190+00	2.625-05	4.662-01	5.015-04	4.724+00
60000	5.351+00	1.806-05	4.014-01	4.131-04	4.949+00
80000	5.644+00	9.949-06	3.162-01	3.043-04	5.327+00
100000	5.903+00	6.216-06	2.624-01	2.401-04	5.641+00

TABLE III. CONT.

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 33 ARSENIC

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.798+05	6.882+02	7.057-01	2.791+05	
1.5	7.117+05	6.516+02	1.341+00	7.110+05	
2	3.942+05	6.109+02	1.985+00	3.936+05	
3	1.362+05	5.322+02	3.177+00	1.357+05	
4	6.320+04	4.645+02	4.233+00	6.273+04	
5	3.458+04	4.067+02	5.174+00	3.417+04	
6	2.104+04	3.572+02	6.028+00	2.068+04	
8	9.546+03	2.775+02	7.532+00	9.261+03	
10	5.149+03	2.186+02	8.810+00	4.922+03	
15	1.219+04	1.323+02	1.117+01	1.205+04	
20	5.737+03	9.034+01	1.271+01	5.634+03	
30	1.883+03	5.111+01	1.440+01	1.818+03	
40	8.367+02	3.301+01	1.519+01	7.885+02	
50	4.455+02	2.302+01	1.552+01	4.069+02	
60	2.681+02	1.692+01	1.560+01	2.356+02	
80	1.241+02	9.987+00	1.542+01	9.874+01	
100	7.191+01	6.640+00	1.506+01	5.021+01	
150	3.193+01	3.095+00	1.404+01	1.480+01	
200	2.113+01	1.774+00	1.304+01	6.311+00	
300	1.425+01	7.990-01	1.149+01	1.968+00	
400	1.169+01	4.510-01	1.035+01	8.920-01	
500	1.026+01	2.884-01	9.475+00	4.950-01	
600	9.291+00	1.995-01	8.780+00	3.118-01	
800	7.994+00	1.117-01	7.726+00	1.564-01	
1000	7.118+00	7.070-02	6.952+00	9.498-02	
1500	5.787+00	3.173-02	5.654+00	4.563-02	5.569-02
2000	5.082+00	1.794-02	4.826+00	2.713-02	2.109-01
3000	4.392+00	8.013-03	3.796+00	1.476-02	5.727-01
4000	4.094+00	4.519-03	3.168+00	1.005-02	9.112-01
5000	3.953+00	2.896-03	2.734+00	7.455-03	1.209+00
6000	3.853+00	2.013-03	2.417+00	5.974-03	1.429+00
8000	3.843+00	1.134-03	1.976+00	4.213-03	1.861+00
10000	3.973+00	7.264-04	1.683+00	3.213-03	2.287+00
15000	4.169+00	3.231-04	1.244+00	2.088-03	2.922+00
20000	4.477+00	1.819-04	9.983-01	1.537-03	3.477+00
30000	4.909+00	8.097-05	7.260-01	9.990-04	4.181+00
40000	5.205+00	4.544-05	5.764-01	7.357-04	4.628+00
50000	5.489+00	2.885-05	4.807-01	5.803-04	5.007+00
60000	5.660+00	1.985-05	4.139-01	4.781-04	5.246+00
80000	5.973+00	1.094-05	3.261-01	3.521-04	5.646+00
100000	6.248+00	6.833-06	2.706-01	2.777-04	5.977+00

Z= 34 SELENIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	3.211+05	7.316+02	6.149-01	3.204+05	
1.5	7.834+05	6.931+02	1.245+00	7.827+05	
2	4.423+05	6.495+02	1.917+00	4.417+05	
3	1.558+05	5.642+02	3.183+00	1.553+05	
4	7.290+04	4.911+02	4.310+00	7.241+04	
5	4.003+04	4.301+02	5.298+00	3.959+04	
6	2.437+04	3.785+02	6.179+00	2.399+04	
8	1.103+04	2.962+02	7.705+00	1.072+04	
10	5.918+03	2.346+02	9.075+00	5.674+03	
15	1.322+04	1.424+02	1.145+01	1.307+04	
20	6.385+03	9.708+01	1.301+01	6.275+03	
30	2.157+03	5.499+01	1.476+01	2.088+03	
40	9.722+02	3.560+01	1.558+01	9.210+02	
50	5.212+02	2.488+01	1.593+01	4.804+02	
60	3.144+02	1.832+01	1.602+01	2.800+02	
80	1.450+02	1.081+01	1.585+01	1.183+02	
100	8.310+01	7.193+00	1.549+01	6.042+01	
150	3.566+01	3.358+00	1.445+01	1.785+01	
200	2.295+01	1.926+00	1.343+01	7.596+00	
300	1.500+01	8.680-01	1.178+01	2.350+00	
400	1.220+01	4.890-01	1.066+01	1.056+00	
500	1.065+01	3.130-01	9.760+00	5.807-01	
600	9.624+00	2.167-01	9.045+00	3.628-01	
800	8.261+00	1.213-01	7.960+00	1.792-01	
1000	7.346+00	7.680-02	7.162+00	1.074-01	
1500	5.971+00	3.447-02	5.825+00	5.158-02	5.968-02
2000	5.247+00	1.949-02	4.972+00	3.065-02	2.250-01
3000	4.546+00	8.706-03	3.912+00	1.666-02	6.090-01
4000	4.248+00	4.910-03	3.264+00	1.133-02	9.675-01
5000	4.111+00	3.147-03	2.817+00	8.404-03	1.283+00
6000	4.014+00	2.188-03	2.490+00	6.732-03	1.515+00
8000	4.015+00	1.232-03	2.036+00	4.745-03	1.973+00
10000	4.160+00	7.893-04	1.734+00	3.617-03	2.422+00
15000	4.378+00	3.511-04	1.282+00	2.349-03	3.093+00
20000	4.711+00	1.976-04	1.029+00	1.730-03	3.681+00
30000	5.175+00	8.798-05	7.480-01	1.124-03	4.426+00
40000	5.493+00	4.940-05	5.938-01	8.276-04	4.898+00
50000	5.795+00	3.136-05	4.953-01	6.527-04	5.299+00
60000	5.978+00	2.158-05	4.265-01	5.376-04	5.551+00
80000	6.309+00	1.189-05	3.360-01	3.959-04	5.973+00
100000	6.601+00	7.434-06	2.788-01	3.122-04	6.322+00

Z= 35 BROMINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	3.492+05	7.767+02	6.000-01	3.484+05	
1.5	1.336+05	7.366+02	1.232+00	1.329+05	
2	4.847+05	6.905+02	1.919+00	4.840+05	
3	1.701+05	5.986+02	3.232+00	1.695+05	
4	7.961+04	5.196+02	4.414+00	7.908+04	
5	4.378+04	4.545+02	5.444+00	4.332+04	
6	2.672+04	4.005+02	6.351+00	2.631+04	
8	1.216+04	3.151+02	7.898+00	1.183+04	
10	6.561+03	2.510+02	9.280+00	6.301+03	
15	1.453+04	1.529+02	1.168+01	1.436+04	
20	7.013+03	1.041+02	1.329+01	6.896+03	
30	2.372+03	5.899+01	1.510+01	2.297+03	
40	1.070+03	3.823+01	1.596+01	1.016+03	
50	5.737+02	2.674+01	1.633+01	5.307+02	
60	3.460+02	1.971+01	1.644+01	3.099+02	
80	1.593+02	1.163+01	1.627+01	1.314+02	
100	9.088+01	7.735+00	1.591+01	6.724+01	
150	3.843+01	3.612+00	1.485+01	1.997+01	
200	2.441+01	2.072+00	1.381+01	8.530+00	
300	1.572+01	9.340-01	1.213+01	2.654+00	
400	1.269+01	5.270-01	1.097+01	1.196+00	
500	1.104+01	3.370-01	1.004+01	6.599-01	
600	9.955+00	2.333-01	9.309+00	4.131-01	
800	8.525+00	1.305-01	8.190+00	2.047-01	
1000	7.578+00	8.270-02	7.372+00	1.230-01	
1500	6.156+00	3.712-02	5.997+00	5.904-02	6.383-02
2000	5.414+00	2.099-02	5.118+00	3.507-02	2.395-01
3000	4.701+00	9.376-03	4.026+00	1.905-02	6.464-01
4000	4.404+00	5.288-03	3.360+00	1.295-02	1.026+00
5000	4.272+00	3.389-03	2.900+00	9.596-03	1.359+00
6000	4.178+00	2.356-03	2.563+00	7.684-03	1.604+00
8000	4.189+00	1.327-03	2.096+00	5.412-03	2.087+00
10000	4.350+00	8.501-04	1.785+00	4.124-03	2.561+00
15000	4.592+00	3.782-04	1.320+00	2.678-03	3.269+00
20000	4.951+00	2.129-04	1.059+00	1.972-03	3.889+00
30000	5.447+00	9.476-05	7.700-01	1.281-03	4.676+00
40000	5.787+00	5.322-05	6.113-01	9.428-04	5.174+00
50000	6.108+00	3.379-05	5.099-01	7.434-04	5.598+00
60000	6.303+00	2.325-05	4.390-01	6.123-04	5.863+00
80000	6.654+00	1.282-05	3.459-01	4.508-04	6.308+00
100000	6.964+00	8.015-06	2.870-01	3.555-04	6.676+00

Z= 36 KRYPTON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	3.971+05	8.234+02	6.494-01	3.963+05	
1.5	1.593+05	7.820+02	1.292+00	1.585+05	
2	5.392+05	7.337+02	1.985+00	5.385+05	
3	1.897+05	6.355+02	3.324+00	1.891+05	
4	8.898+04	5.501+02	4.544+00	8.842+04	
5	4.904+04	4.803+02	5.613+00	4.855+04	
6	2.999+04	4.232+02	6.545+00	2.956+04	
8	1.369+04	3.343+02	8.114+00	1.335+04	
10	7.409+03	2.677+02	9.419+00	7.132+03	
15	1.620+04	1.639+02	1.188+01	1.603+04	
20	7.756+03	1.115+02	1.354+01	7.631+03	
30	2.602+03	6.312+01	1.542+01	2.523+03	
40	1.170+03	4.090+01	1.632+01	1.112+03	
50	6.263+02	2.861+01	1.672+01	5.810+02	
60	3.773+02	2.108+01	1.684+01	3.394+02	
80	1.733+02	1.243+01	1.669+01	1.441+02	
100	9.855+01	8.269+00	1.633+01	7.395+01	
150	4.121+01	3.860+00	1.526+01	2.209+01	
200	2.590+01	2.214+00	1.420+01	9.491+00	
300	1.649+01	9.980-01	1.251+01	2.978+00	
400	1.319+01	5.630-01	1.128+01	1.351+00	
500	1.144+01	3.600-01	1.033+01	7.490-01	
600	1.029+01	2.493-01	9.574+00	4.708-01	
800	8.800+00	1.395-01	8.426+00	2.347-01	
1000	7.812+00	8.840-02	7.582+00	1.416-01	
1500	6.343+00	3.969-02	6.168+00	6.794-02	6.816-02
2000	5.581+00	2.244-02	5.264+00	4.034-02	2.546-01
3000	4.859+00	1.002-02	4.141+00	2.189-02	6.850-01
4000	4.562+00	5.654-03	3.456+00	1.487-02	1.085+00
5000	4.435+00	3.624-03	2.983+00	1.101-02	1.437+00
6000	4.344+00	2.519-03	2.636+00	8.816-03	1.696+00
8000	4.368+00	1.419-03	2.156+00	6.206-03	2.204+00
10000	4.544+00	9.090-04	1.836+00	4.727-03	2.703+00
15000	4.811+00	4.043-04	1.358+00	3.069-03	3.450+00
20000	5.195+00	2.276-04	1.089+00	2.259-03	4.104+00
30000	5.726+00	1.013-04	7.920-01	1.467-03	4.933+00
40000	6.088+00	5.691-05	6.288-01	1.080-03	5.458+00
50000	6.429+00	3.614-05	5.244-01	8.512-04	5.904+00
60000	6.635+00	2.488-05	4.516-01	7.010-04	6.183+00
80000	7.007+00	1.372-05	3.558-01	5.160-04	6.651+00
100000	7.334+00	8.579-06	2.952-01	4.068-04	7.039+00

TABLE III. CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 37 RUBIDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	4.561+05	8.558+02	9.649-01	4.552+05	
1.5	1.738+05	8.086+02	1.620+00	1.730+05	
2	5.130+05	7.596+02	2.287+00	5.123+05	
3	2.109+05	6.634+02	3.578+00	2.102+05	
4	9.923+04	5.764+02	4.773+00	9.865+04	
5	5.478+04	5.035+02	5.844+00	5.427+04	
6	3.352+04	4.439+02	6.787+00	3.306+04	
8	1.530+04	3.522+02	8.368+00	1.494+04	
10	8.269+03	2.836+02	9.672+00	7.975+03	
15	2.676+03	1.749+02	1.214+01	2.489+03	
20	8.387+03	1.189+02	1.383+01	8.254+03	
30	2.874+03	6.740+01	1.576+01	2.791+03	
40	1.304+03	4.384+01	1.670+01	1.243+03	
50	7.005+02	3.078+01	1.712+01	6.526+02	
60	4.223+02	2.276+01	1.726+01	3.823+02	
80	1.932+02	1.341+01	1.711+01	1.627+02	
100	1.092+02	8.931+00	1.675+01	8.351+01	
150	4.476+01	4.178+00	1.567+01	2.491+01	
200	2.766+01	2.399+00	1.458+01	1.068+01	
300	1.728+01	1.082+00	1.286+01	3.346+00	
400	1.372+01	6.110-01	1.159+01	1.518+00	
500	1.185+01	3.900-01	1.062+01	8.433-01	
600	1.064+01	2.699-01	9.838+00	5.314-01	
800	9.078+00	1.515-01	8.659+00	2.666-01	
1000	8.051+00	9.600-02	7.793+00	1.621-01	
1500	6.533+00	4.311-02	6.340+00	7.773-02	7.266-02
2000	5.752+00	2.437-02	5.411+00	4.615-02	2.702-01
3000	5.018+00	1.089-02	4.257+00	2.501-02	7.248-01
4000	4.723+00	6.141-03	3.553+00	1.698-02	1.147+00
5000	4.601+00	3.937-03	3.066+00	1.257-02	1.518+00
6000	4.513+00	2.737-03	2.710+00	1.006-02	1.790+00
8000	4.549+00	1.542-03	2.216+00	7.076-03	2.325+00
10000	4.742+00	9.874-04	1.887+00	5.387-03	2.849+00
15000	5.035+00	4.392-04	1.396+00	3.497-03	3.635+00
20000	5.445+00	2.472-04	1.119+00	2.574-03	4.323+00
30000	6.012+00	1.101-04	8.141-01	1.671-03	5.196+00
40000	6.396+00	6.184-05	6.463-01	1.230-03	5.748+00
50000	6.757+00	3.928-05	5.391-01	9.692-04	6.217+00
60000	6.976+00	2.703-05	4.642-01	7.981-04	6.511+00
80000	7.369+00	1.491-05	3.657-01	5.873-04	7.002+00
100000	7.713+00	9.330-06	3.034-01	4.630-04	7.410+00

Z= 38 STRONTIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	5.182+05	8.964+02	1.174+00	5.173+05	
1.5	1.990+05	8.419+02	1.917+00	1.982+05	
2	3.920+05	7.881+02	2.593+00	3.912+05	
3	2.321+05	6.893+02	3.864+00	2.314+05	
4	1.103+05	6.016+02	5.033+00	1.097+05	
5	6.110+04	5.268+02	6.097+00	6.057+04	
6	3.741+04	4.648+02	7.046+00	3.694+04	
8	1.702+04	3.697+02	8.640+00	1.664+04	
10	9.149+03	2.992+02	9.944+00	8.840+03	
15	2.909+03	1.861+02	1.241+01	2.711+03	
20	9.080+03	1.266+02	1.412+01	8.939+03	
30	3.114+03	7.161+01	1.610+01	3.026+03	
40	1.419+03	4.645+01	1.707+01	1.355+03	
50	7.659+02	3.252+01	1.752+01	7.159+02	
60	4.635+02	2.398+01	1.767+01	4.218+02	
80	2.131+02	1.413+01	1.753+01	1.814+02	
100	1.204+02	9.400+00	1.717+01	9.386+01	
150	4.885+01	4.389+00	1.607+01	2.839+01	
200	2.975+01	2.517+00	1.496+01	1.227+01	
300	1.820+01	1.135+00	1.320+01	3.864+00	
400	1.429+01	6.400-01	1.190+01	1.752+00	
500	1.228+01	4.090-01	1.090+01	9.687-01	
600	1.099+01	2.830-01	1.010+01	6.066-01	
800	9.351+00	1.588-01	8.893+00	2.997-01	
1000	8.283+00	1.007-01	8.003+00	1.791-01	
1500	6.719+00	4.522-02	6.511+00	8.585-02	7.734-02
2000	5.920+00	2.557-02	5.557+00	5.095-02	2.864-01
3000	5.177+00	1.142-02	4.372+00	2.758-02	7.659-01
4000	4.884+00	6.443-03	3.649+00	1.871-02	1.210+00
5000	4.768+00	4.130-03	3.149+00	1.385-02	1.601+00
6000	4.684+00	2.871-03	2.783+00	1.108-02	1.887+00
8000	4.734+00	1.617-03	2.276+00	7.788-03	2.448+00
10000	4.943+00	1.036-03	1.938+00	5.926-03	2.998+00
15000	5.262+00	4.608-04	1.433+00	3.846-03	3.825+00
20000	5.700+00	2.594-04	1.150+00	2.830-03	4.547+00
30000	6.303+00	1.155-04	8.361-01	1.836-03	5.465+00
40000	6.711+00	6.489-05	6.638-01	1.351-03	6.045+00
50000	7.093+00	4.123-05	5.537-01	1.065-03	6.538+00
60000	7.324+00	2.838-05	4.767-01	8.769-04	6.846+00
80000	7.738+00	1.566-05	3.756-01	6.452-04	7.362+00
100000	8.101+00	9.799-06	3.116-01	5.086-04	7.789+00

Z= 39 YTTRIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	5.848+05	9.465+02	1.148+00	5.839+05	
1.5	2.187+05	8.885+02	1.902+00	2.178+05	
2	1.091+05	8.298+02	2.597+00	1.082+05	
3	2.562+05	7.234+02	3.897+00	2.554+05	
4	1.212+05	6.311+02	5.091+00	1.206+05	
5	6.728+04	5.526+02	6.184+00	6.672+04	
6	4.136+04	4.876+02	7.169+00	4.086+04	
8	1.903+04	3.885+02	9.100+00	1.863+04	
10	1.035+04	3.156+02	1.015+01	1.003+04	
15	3.392+03	1.978+02	1.267+01	3.182+03	
20	1.019+04	1.347+02	1.441+01	1.004+04	
30	3.491+03	7.610+01	1.644+01	3.399+03	
40	1.585+03	4.933+01	1.744+01	1.518+03	
50	8.522+02	3.450+01	1.791+01	7.998+02	
60	5.136+02	2.541+01	1.808+01	4.701+02	
80	2.343+02	1.498+01	1.795+01	2.013+02	
100	1.314+02	9.958+00	1.759+01	1.039+02	
150	5.240+01	4.645+00	1.648+01	3.127+01	
200	3.151+01	2.664+00	1.535+01	1.349+01	
300	1.903+01	1.200+00	1.357+01	4.255+00	
400	1.482+01	6.770-01	1.221+01	1.937+00	
500	1.269+01	4.330-01	1.118+01	1.077+00	
600	1.135+01	3.000-01	1.037+01	6.782-01	
800	9.627+00	1.679-01	9.120+00	3.394-01	
1000	8.525+00	1.065-01	8.213+00	2.054-01	
1500	6.910+00	4.783-02	6.682+00	9.840-02	8.220-02
2000	6.092+00	2.704-02	5.703+00	5.838-02	3.030-01
3000	5.339+00	1.208-02	4.487+00	3.158-02	8.080-01
4000	5.047+00	6.815-03	3.745+00	2.140-02	1.274+00
5000	4.938+00	4.369-03	3.232+00	1.583-02	1.686+00
6000	4.858+00	3.037-03	2.856+00	1.266-02	1.986+00
8000	4.921+00	1.711-03	2.336+00	8.896-03	2.575+00
10000	5.147+00	1.096-03	1.989+00	6.767-03	3.151+00
15000	5.494+00	4.875-04	1.471+00	4.390-03	4.018+00
20000	5.960+00	2.744-04	1.180+00	3.230-03	4.777+00
30000	6.601+00	1.221-04	8.582-01	2.095-03	5.740+00
40000	7.032+00	6.866-05	6.813-01	1.542-03	6.349+00
50000	7.436+00	4.363-05	5.683-01	1.215-03	6.866+00
60000	7.679+00	3.004-05	4.893-01	1.000-03	7.189+00
80000	8.115+00	1.658-05	3.955-01	7.358-04	7.729+00
100000	8.497+00	1.037-05	3.198-01	5.799-04	8.176+00

Z= 40 ZIRCONIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	6.954+05	9.987+02	1.107+00	6.944+05	
1.5	2.527+05	9.383+02	1.872+00	2.518+05	
2	1.235+05	8.756+02	2.585+00	1.226+05	
3	2.852+05	7.612+02	3.915+00	2.844+05	
4	1.347+05	6.632+02	5.135+00	1.341+05	
5	7.464+04	5.803+02	6.257+00	7.405+04	
6	4.581+04	5.118+02	7.275+00	4.529+04	
8	2.101+04	4.080+02	9.445+00	2.059+04	
10	1.140+04	3.325+02	1.035+01	1.105+04	
15	3.712+03	2.099+02	1.292+01	3.489+03	
20	1.085+04	1.431+02	1.469+01	1.069+04	
30	3.798+03	8.078+01	1.677+01	3.700+03	
40	1.738+03	5.231+01	1.781+01	1.668+03	
50	9.370+02	3.654+01	1.830+01	8.822+02	
60	5.646+02	2.689+01	1.848+01	5.192+02	
80	2.564+02	1.585+01	1.837+01	2.222+02	
100	1.429+02	1.053+01	1.800+01	1.144+02	
150	5.602+01	4.908+00	1.688+01	3.424+01	
200	3.324+01	2.813+00	1.573+01	1.470+01	
300	1.980+01	1.267+00	1.392+01	4.611+00	
400	1.533+01	7.150-01	1.252+01	2.096+00	
500	1.309+01	4.570-01	1.147+01	1.166+00	
600	1.168+01	3.160-01	1.063+01	7.361-01	
800	9.908+00	1.772-01	9.360+00	3.710-01	
1000	8.762+00	1.124-01	8.423+00	2.267-01	
1500	7.099+00	5.048-02	6.853+00	1.086-01	8.725-02
2000	6.263+00	2.854-02	5.850+00	6.438-02	3.203-01
3000	5.501+00	1.276-02	4.602+00	3.479-02	8.515-01
4000	5.213+00	7.194-03	3.841+00	2.356-02	1.341+00
5000	5.110+00	4.612-03	3.315+00	1.742-02	1.773+00
6000	5.035+00	3.206-03	2.930+00	1.393-02	2.088+00
8000	5.112+00	1.806-03	2.396+00	9.780-03	2.704+00
10000	5.356+00	1.157-03	2.040+00	7.436-03	3.307+00
15000	5.731+00	5.146-04	1.509+00	4.823-03	4.217+00
20000	6.225+00	2.897-04	1.210+00	3.548-03	5.011+00
30000	6.904+00	1.289-04	8.802-01	2.301-03	6.022+00
40000	7.360+00	7.249-05	6.988-01	1.692-03	6.660+00
50000	7.785+00	4.608-05	5.829-01	1.334-03	7.201+00
60000	8.042+00	3.172-05	5.019-01	1.098-03	7.539+00
80000	8.500+00	1.751-05	3.954-01	8.075-04	8.104+00
100000	8.901+00	1.096-05	3.280-01	6.363-04	8.572+00

TABLE III. CONT. PHOTON CROSS SECTION COMPARISON

ENOF/B IN BARNS/ATOM

Z= 41 NIOBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	7.628+05	1.057+03	1.054+00	7.617+05
1.5	2.773+05	9.976+02	1.825+00	2.763+05
2	1.355+05	9.331+02	2.556+00	1.345+05
3	3.045+05	8.098+02	3.916+00	3.037+05
4	1.468+05	7.026+02	5.166+00	1.461+05
5	8.220+04	6.126+02	6.316+00	8.158+04
6	5.070+04	5.390+02	7.365+00	5.015+04
8	2.329+04	4.293+02	9.671+00	2.285+04
10	1.259+04	3.505+02	1.054+01	1.223+04
15	4.028+03	2.228+02	1.317+01	3.792+03
20	1.193+04	1.521+02	1.498+01	1.176+04
30	4.175+03	8.582+01	1.710+01	4.072+03
40	1.919+03	5.563+01	1.817+01	1.845+03
50	1.039+03	3.888+01	1.869+01	9.816+02
60	6.285+02	2.862+01	1.888+01	5.810+02
80	2.868+02	1.687+01	1.878+01	2.511+02
100	1.599+02	1.121+01	1.842+01	1.303+02
150	6.199+01	5.227+00	1.729+01	3.947+01
200	3.616+01	2.996+00	1.611+01	1.705+01
300	2.098+01	1.350+00	1.427+01	5.362+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.602+01	7.610-01	1.283+01	2.426+00	
500	1.358+01	4.870-01	1.175+01	1.340+00	
600	1.208+01	3.370-01	1.090+01	8.380-01	
800	1.020+01	1.887-01	9.590+00	4.136-01	
1000	9.000+00	1.197-01	8.633+00	2.471-01	
1500	7.289+00	5.377-02	7.024+00	1.183-01	9.248-02
2000	6.434+00	3.040-02	5.996+00	7.012-02	3.380-01
3000	5.665+00	1.358-02	4.718+00	3.785-02	8.961-01
4000	5.380+00	7.662-03	3.937+00	2.562-02	1.410+00
5000	5.284+00	4.912-03	3.398+00	1.893-02	1.862+00
6000	5.214+00	3.415-03	3.003+00	1.513-02	2.192+00
8000	5.305+00	1.924-03	2.456+00	1.062-02	2.837+00
10000	5.567+00	1.232-03	2.091+00	8.070-03	3.467+00
15000	5.972+00	5.482-04	1.547+00	5.233-03	4.419+00
20000	6.496+00	3.085-04	1.241+00	3.848-03	5.251+00
30000	7.214+00	1.373-04	9.022-01	2.495-03	6.309+00
40000	7.695+00	7.722-05	7.163-01	1.835-03	6.977+00
50000	8.142+00	4.910-05	5.975-01	1.446-03	7.543+00
60000	8.412+00	3.380-05	5.144-01	1.190-03	7.896+00
80000	8.893+00	1.867-05	4.053-01	8.751-04	8.487+00
100000	9.313+00	1.169-05	3.363-01	6.895-04	8.976+00

Z= 42 MOLYBDENUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	8.544+05	1.111+03	9.916-01	8.533+05
1.5	3.126+05	1.051+03	1.766+00	3.116+05
2	1.534+05	9.843+02	2.511+00	1.524+05
3	3.347+05	8.546+02	3.904+00	3.338+05
4	1.607+05	7.400+02	5.183+00	1.600+05
5	8.988+04	6.445+02	6.361+00	8.923+04
6	5.547+04	5.667+02	7.439+00	5.490+04
8	2.557+04	4.506+02	9.779+00	2.511+04
10	1.389+04	3.683+02	1.104+01	1.351+04
15	4.499+03	2.359+02	1.358+01	4.250+03
20	1.291+04	1.612+02	1.536+01	1.274+04
30	4.521+03	9.113+01	1.748+01	4.412+03
40	2.088+03	5.921+01	1.857+01	2.010+03
50	1.137+03	4.147+01	1.910+01	1.077+03
60	6.912+02	3.057+01	1.930+01	6.414+02
80	3.177+02	1.803+01	1.920+01	2.805+02
100	1.777+02	1.198+01	1.884+01	1.469+02
150	6.858+01	5.592+00	1.769+01	4.529+01
200	3.948+01	3.207+00	1.649+01	1.978+01
300	2.230+01	1.445+00	1.457+01	6.290+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.681+01	8.150-01	1.314+01	2.857+00	
500	1.414+01	5.220-01	1.204+01	1.577+00	
600	1.251+01	3.610-01	1.116+01	9.841-01	
800	1.051+01	2.019-01	9.825+00	4.813-01	
1000	9.255+00	1.282-01	8.843+00	2.842-01	
1500	7.487+00	5.758-02	7.195+00	1.360-01	9.790-02
2000	6.611+00	3.257-02	6.142+00	8.058-02	3.563-01
3000	5.833+00	1.455-02	4.833+00	4.346-02	9.419-01
4000	5.551+00	8.208-03	4.033+00	2.940-02	1.480+00
5000	5.462+00	5.262-03	3.481+00	2.171-02	1.954+00
6000	5.396+00	3.658-03	3.076+00	1.734-02	2.299+00
8000	5.502+00	2.061-03	2.516+00	1.217-02	2.972+00
10000	5.783+00	1.320-03	2.142+00	9.241-03	3.630+00
15000	6.217+00	5.873-04	1.584+00	5.991-03	4.626+00
20000	6.771+00	3.305-04	1.271+00	4.405-03	5.496+00
30000	7.530+00	1.471-04	9.243-01	2.856-03	6.602+00
40000	8.036+00	8.274-05	7.338-01	2.100-03	7.300+00
50000	8.506+00	5.261-05	6.121-01	1.654-03	7.892+00
60000	8.789+00	3.623-05	5.270-01	1.361-03	8.261+00
80000	9.294+00	2.001-05	4.152-01	1.001-03	8.878+00
100000	9.733+00	1.253-05	3.445-01	7.884-04	9.388+00

Z= 43 TECHNETIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	9.376+05	1.163+03	1.101+00	9.364+05
1.5	3.482+05	1.098+03	1.937+00	3.471+05
2	1.727+05	1.028+03	2.703+00	1.717+05
3	3.200+05	8.925+02	4.097+00	3.191+05
4	1.768+05	7.740+02	5.367+00	1.761+05
5	9.851+04	6.749+02	6.533+00	9.783+04
6	6.069+04	5.935+02	7.607+00	6.009+04
8	2.796+04	4.716+02	9.480+00	2.748+04
10	1.521+04	3.858+02	1.099+01	1.481+04
15	4.959+03	2.487+02	1.369+01	4.697+03
20	2.225+03	1.706+02	1.555+01	2.039+03
30	4.898+03	9.605+01	1.777+01	4.784+03
40	2.268+03	6.192+01	1.890+01	2.187+03
50	1.231+03	4.303+01	1.946+01	1.169+03
60	7.447+02	3.152+01	1.969+01	6.935+02
80	3.387+02	1.859+01	1.961+01	3.005+02
100	1.876+02	1.233+01	1.924+01	1.560+02
150	7.121+01	5.725+00	1.809+01	4.739+01
200	4.068+01	3.276+00	1.687+01	2.053+01
300	2.289+01	1.474+00	1.490+01	6.512+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.725+01	8.310-01	1.345+01	2.977+00	
500	1.452+01	5.320-01	1.232+01	1.663+00	
600	1.284+01	3.680-01	1.142+01	1.052+00	
800	1.080+01	2.060-01	1.006+01	5.319-01	
1000	9.509+00	1.306-01	9.053+00	3.253-01	
1500	7.684+00	5.866-02	7.366+00	1.555-01	1.037-01
2000	6.789+00	3.318-02	6.288+00	9.209-02	3.753-01
3000	6.002+00	1.483-02	4.948+00	4.970-02	9.893-01
4000	5.723+00	8.364-03	4.129+00	3.360-02	1.552+00
5000	5.642+00	5.362-03	3.564+00	2.480-02	2.048+00
6000	5.581+00	3.728-03	3.150+00	1.980-02	2.408+00
8000	5.701+00	2.100-03	2.576+00	1.388-02	3.110+00
10000	5.999+00	1.345-03	2.193+00	1.054-02	3.794+00
15000	6.465+00	5.984-04	1.622+00	6.831-03	4.835+00
20000	7.051+00	3.368-04	1.301+00	5.022-03	5.744+00
30000	7.848+00	1.499-04	9.464-01	3.255-03	6.899+00
40000	8.382+00	8.432-05	7.513-01	2.393-03	7.628+00
50000	8.876+00	5.363-05	6.267-01	1.885-03	8.248+00
60000	9.173+00	3.693-05	5.396-01	1.551-03	8.632+00
80000	9.701+00	2.040-05	4.251-01	1.140-03	9.275+00
100000	1.016+01	1.278-05	3.527-01	8.980-04	9.806+00

Z= 44 RUTHENIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.066+06	1.226+03	9.448-01	1.065+06
1.5	3.906+05	1.163+03	1.748+00	3.894+05
2	1.918+05	1.093+03	2.560+00	1.908+05
3	3.387+05	9.509+02	4.010+00	3.377+05
4	1.902+05	8.227+02	5.305+00	1.893+05
5	1.070+05	7.149+02	6.507+00	1.063+05
6	6.633+04	6.268+02	7.611+00	6.570+04
8	3.078+04	4.964+02	9.449+00	3.027+04
10	1.679+04	4.059+02	1.103+01	1.637+04
15	5.476+03	2.629+02	1.387+01	5.199+03
20	2.446+03	1.808+02	1.578+01	2.250+03
30	5.286+03	1.015+02	1.807+01	5.167+03
40	2.459+03	6.499+01	1.925+01	2.375+03
50	1.338+03	4.491+01	1.984+01	1.273+03
60	8.101+02	3.276+01	2.008+01	7.573+02
80	3.684+02	1.933+01	2.001+01	3.290+02
100	2.036+02	1.279+01	1.965+01	1.712+02
150	7.651+01	5.917+00	1.849+01	5.210+01
200	4.324+01	3.380+00	1.725+01	2.261+01
300	2.397+01	1.518+00	1.527+01	7.181+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.791+01	8.560-01	1.376+01	3.289+00	
500	1.500+01	5.480-01	1.261+01	1.840+00	
600	1.324+01	3.790-01	1.169+01	1.166+00	
800	1.110+01	2.120-01	1.030+01	5.913-01	
1000	9.761+00	1.344-01	9.264+00	3.628-01	
1500	7.882+00	6.037-02	7.538+00	1.732-01	1.097-01
2000	6.967+00	3.415-02	6.435+00	1.025-01	3.949-01
3000	6.172+00	1.526-02	5.064+00	5.538-02	1.038+00
4000	5.898+00	8.608-03	4.226+00	3.741-02	1.626+00
5000	5.824+00	5.518-03	3.647+00	2.760-02	2.144+00
6000	5.768+00	3.837-03	3.224+00	2.203-02	2.519+00
8000	5.903+00	2.161-03	2.636+00	1.543-02	3.250+00
10000	6.220+00	1.384-03	2.245+00	1.171-02	3.962+00
15000	6.717+00	6.159-04	1.660+00	7.590-03	5.049+00
20000	7.335+00	3.466-04	1.332+00	5.579-03	5.998+00
30000	8.173+00	1.543-04	9.685-01	3.615-03	7.201+00
40000	8.735+00	8.680-05	7.689-01	2.657-03	7.963+00
50000	9.253+00	5.522-05	6.413-01	2.093-03	8.610+00
60000	9.564+00	3.803-05	5.522-01	1.722-03	9.010+00
80000	1.012+01	2.101-05	4.351-01	1.266-03	9.680+00
100000	1.060+01	1.317-05	3.610-01	9.967-04	1.023+01

TABLE III, CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 45 RHODIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.242+06	1.285+03	8.293-01	1.241+06
1.5	4.313+05	1.222+03	1.599+00	4.301+05
2	2.040+05	1.150+03	2.420+00	2.028+05
3	7.130+04	1.002+03	3.912+00	7.030+04
4	2.076+05	8.676+02	5.235+00	2.067+05
5	1.167+05	7.533+02	6.467+00	1.160+05
6	7.240+04	6.596+02	7.602+00	7.173+04
8	3.363+04	5.210+02	9.511+00	3.310+04
10	1.837+04	4.258+02	1.124+01	1.793+04
15	6.012+03	2.771+02	1.414+01	5.720+03
20	2.694+03	1.912+02	1.609+01	2.486+03
30	5.604+03	1.070+02	1.841+01	5.478+03
40	2.637+03	6.819+01	1.962+01	2.550+03
50	1.444+03	4.691+01	2.022+01	1.377+03
60	8.776+02	3.412+01	2.048+01	8.230+02
80	4.002+02	2.013+01	2.042+01	3.596+02
100	2.210+02	1.330+01	2.006+01	1.876+02
150	8.233+01	6.135+00	1.890+01	5.730+01
200	4.602+01	3.500+00	1.763+01	2.489+01
300	2.505+01	1.571+00	1.557+01	7.912+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.857+01	8.850-01	1.406+01	3.626+00	
500	1.549+01	5.660-01	1.289+01	2.030+00	
600	1.363+01	3.920-01	1.195+01	1.289+00	
800	1.144+01	2.190-01	1.057+01	6.554-01	
1000	1.002+01	1.390-01	9.473+00	4.036-01	
1500	8.080+00	6.245-02	7.709+00	1.925-01	1.159-01
2000	7.145+00	3.532-02	6.581+00	1.139-01	4.151-01
3000	6.344+00	1.579-02	5.178+00	6.156-02	1.088+00
4000	6.073+00	8.904-03	4.322+00	4.156-02	1.701+00
5000	6.008+00	5.708-03	3.730+00	3.064-02	2.242+00
6000	5.957+00	3.969-03	3.297+00	2.445-02	2.632+00
8000	6.108+00	2.236-03	2.696+00	1.712-02	3.393+00
10000	6.443+00	1.432-03	2.296+00	1.299-02	4.133+00
15000	6.973+00	6.372-04	1.698+00	8.412-03	5.266+00
20000	7.624+00	3.586-04	1.362+00	6.182-03	6.256+00
30000	8.503+00	1.596-04	9.905-01	4.005-03	7.508+00
40000	9.093+00	8.980-05	7.863-01	2.943-03	8.304+00
50000	9.637+00	5.713-05	6.559-01	2.318-03	8.978+00
60000	9.962+00	3.936-05	5.647-01	1.906-03	9.395+00
80000	1.054+01	2.175-05	4.449-01	1.401-03	1.009+01
100000	1.104+01	1.363-05	3.692-01	1.103-03	1.067+01

Z= 46 PALLADIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.384+06	1.352+03	7.408-01	1.382+06
1.5	4.885+05	1.292+03	1.481+00	4.872+05
2	2.337+05	1.220+03	2.282+00	2.324+05
3	8.299+04	1.066+03	3.797+00	8.192+04
4	2.224+05	9.213+02	5.159+00	2.215+05
5	1.261+05	7.981+02	6.413+00	1.252+05
6	7.858+04	6.970+02	7.581+00	7.787+04
8	3.672+04	5.485+02	9.663+00	3.616+04
10	2.012+04	4.476+02	1.137+01	1.966+04
15	6.592+03	2.921+02	1.437+01	6.286+03
20	2.948+03	2.022+02	1.636+01	2.729+03
30	6.209+03	1.130+02	1.873+01	6.077+03
40	2.860+03	7.169+01	1.997+01	2.768+03
50	1.550+03	4.917+01	2.060+01	1.481+03
60	9.376+02	3.569+01	2.087+01	8.811+02
80	4.266+02	2.106+01	2.083+01	3.847+02
100	2.357+02	1.390+01	2.047+01	2.014+02
150	8.788+01	6.397+00	1.929+01	6.219+01
200	4.894+01	3.646+00	1.801+01	2.728+01
300	2.634+01	1.635+00	1.593+01	8.784+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	1.934+01	9.210-01	1.437+01	4.048+00	
500	1.603+01	5.900-01	1.317+01	2.269+00	
600	1.406+01	4.080-01	1.222+01	1.437+00	
800	1.171+01	2.280-01	1.076+01	7.238-01	
1000	1.027+01	1.446-01	9.682+00	4.395-01	
1500	8.276+00	6.497-02	7.879+00	2.095-01	1.223-01
2000	7.323+00	3.675-02	6.726+00	1.238-01	4.359-01
3000	6.516+00	1.643-02	5.293+00	6.698-02	1.139+00
4000	6.251+00	9.265-03	4.418+00	4.519-02	1.779+00
5000	6.195+00	5.940-03	3.813+00	3.329-02	2.343+00
6000	6.149+00	4.130-03	3.370+00	2.655-02	2.748+00
8000	6.315+00	2.326-03	2.755+00	1.858-02	3.538+00
10000	6.669+00	1.490-03	2.346+00	1.409-02	4.307+00
15000	7.233+00	6.631-04	1.735+00	9.125-03	5.488+00
20000	7.918+00	3.731-04	1.392+00	6.705-03	6.518+00
30000	8.838+00	1.661-04	1.013+00	4.343-03	7.821+00
40000	9.457+00	9.346-05	8.038-01	3.191-03	8.650+00
50000	1.003+01	5.946-05	6.704-01	2.512-03	9.354+00
60000	1.037+01	4.097-05	5.772-01	2.066-03	9.787+00
80000	1.097+01	2.265-05	4.548-01	1.518-03	1.051+01
100000	1.149+01	1.420-05	3.773-01	1.196-03	1.111+01

Z= 47 SILVER

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.423+06	1.408+03	8.694-01	1.422+06
1.5	5.213+05	1.344+03	1.625+00	5.199+05
2	2.560+05	1.269+03	2.399+00	2.547+05
3	9.426+04	1.111+03	3.884+00	9.315+04
4	2.401+05	9.637+02	5.250+00	2.391+05
5	1.358+05	8.363+02	6.505+00	1.350+05
6	8.465+04	7.308+02	7.673+00	8.391+04
8	3.961+04	5.743+02	9.768+00	3.903+04
10	2.176+04	4.681+02	1.152+01	2.128+04
15	7.190+03	3.065+02	1.460+01	6.869+03
20	3.241+03	2.131+02	1.663+01	3.011+03
30	6.549+03	1.190+02	1.905+01	6.411+03
40	3.079+03	7.525+01	2.032+01	2.984+03
50	1.691+03	5.151+01	2.098+01	1.618+03
60	1.031+03	3.735+01	2.126+01	9.722+02
80	4.727+02	2.204+01	2.124+01	4.294+02
100	2.616+02	1.453+01	2.088+01	2.262+02
150	9.663+01	6.679+00	1.969+01	7.026+01
200	5.300+01	3.804+00	1.839+01	3.080+01
300	2.782+01	1.705+00	1.627+01	9.848+00

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.014+01	9.600-01	1.468+01	4.496+00	
500	1.657+01	6.150-01	1.346+01	2.495+00	
600	1.447+01	4.260-01	1.248+01	1.566+00	
800	1.200+01	2.380-01	1.099+01	7.749-01	
1000	1.051+01	1.509-01	9.892+00	4.631-01	
1500	8.468+00	6.781-02	8.051+00	2.205-01	1.289-01
2000	7.499+00	3.836-02	6.873+00	1.302-01	4.573-01
3000	6.688+00	1.714-02	5.408+00	7.052-02	1.192+00
4000	6.429+00	9.670-03	4.514+00	4.754-02	1.858+00
5000	6.382+00	6.200-03	3.896+00	3.501-02	2.445+00
6000	6.342+00	4.310-03	3.443+00	2.791-02	2.867+00
8000	6.525+00	2.428-03	2.816+00	1.952-02	3.687+00
10000	6.898+00	1.555-03	2.398+00	1.479-02	4.484+00
15000	7.497+00	6.921-04	1.773+00	9.579-03	5.713+00
20000	8.216+00	3.895-04	1.422+00	7.037-03	6.786+00
30000	9.179+00	1.733-04	1.035+00	4.556-03	8.140+00
40000	9.828+00	9.756-05	8.213-01	3.347-03	9.003+00
50000	1.042+01	6.208-05	6.850-01	2.635-03	9.736+00
60000	1.078+01	4.278-05	5.898-01	2.167-03	1.018+01
80000	1.140+01	2.365-05	4.647-01	1.592-03	1.094+01
100000	1.195+01	1.483-05	3.856-01	1.253-03	1.156+01

Z= 48 CADMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.707+06	1.467+03	9.726-01	1.706+06
1.5	6.136+05	1.398+03	1.784+00	6.122+05
2	2.972+05	1.319+03	2.570+00	2.959+05
3	1.073+05	1.156+03	4.039+00	1.062+05
4	2.343+05	1.005+03	5.401+00	2.333+05
5	1.516+05	8.741+02	6.653+00	1.507+05
6	9.362+04	7.647+02	7.815+00	9.285+04
8	4.339+04	6.007+02	9.907+00	4.278+04
10	2.374+04	4.890+02	1.168+01	2.324+04
15	7.848+03	3.209+02	1.484+01	7.512+03
20	3.559+03	2.241+02	1.691+01	3.318+03
30	7.115+03	1.251+02	1.938+01	6.971+03
40	3.368+03	7.901+01	2.068+01	3.268+03
50	1.852+03	5.402+01	2.135+01	1.776+03
60	1.128+03	3.914+01	2.165+01	1.067+03
80	5.150+02	2.311+01	2.164+01	4.702+02
100	2.835+02	1.523+01	2.128+01	2.470+02
150	1.033+02	6.992+00	2.009+01	7.622+01
200	5.607+01	3.980+00	1.877+01	3.332+01
300	2.905+01	1.784+00	1.660+01	1.066+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.089+01	1.005+00	1.499+01	4.896+00	
500	1.713+01	6.430-01	1.374+01	2.741+00	
600	1.493+01	4.450-01	1.274+01	1.738+00	
800	1.235+01	2.490-01	1.122+01	8.801-01	
1000	1.080+01	1.580-01	1.010+01	5.388-01	
1500	8.684+00	7.100-02	8.220+00	2.563-01	1.358-01
2000	7.688+00	4.017-02	7.018+00	1.513-01	4.792-01
3000	6.868+00	1.795-02	5.523+00	8.199-02	1.245+00
4000	6.613+00	1.013-02	4.609+00	5.523-02	1.938+00
5000	6.575+00	6.493-03	3.978+00	4.065-02	2.550+00
6000	6.541+00	4.514-03	3.516+00	3.239-02	2.988+00
8000	6.739+00	2.543-03	2.875+00	2.264-02	3.838+00
10000	7.131+00	1.629-03	2.448+00	1.715-02	4.664+00
15000	7.765+00	7.249-04	1.811+00	1.110-02	5.942+00
20000	8.519+00	4.079-04	1.453+00	8.155-03	7.058+00
30000	9.525+00	1.815-04	1.056+00	5.279-03	8.463+00
40000	1.020+01	1.022-04	8.387-01	3.877-03	9.362+00
50000	1.083+01	6.503-05	6.995-01	3.052-03	1.012+01
60000	1.120+01	4.482-05	6.023-01	2.510-03	1.059+01
80000	1.185+01	2.479-05	4.745-01	1.844-03	1.137+01
100000	1.241+01	1.555-05	3.937-01	1.451-03	1.202+01

TABLE III, CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 49 INDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.816+06	1.522+03	1.007+00	1.815+06
1.5	6.617+05	1.447+03	1.850+00	6.602+05
2	3.235+05	1.365+03	2.664+00	3.222+05
3	1.184+05	1.198+03	4.175+00	1.172+05
4	2.606+05	1.044+03	5.556+00	2.595+05
5	1.665+05	9.107+02	6.814+00	1.655+05
6	1.020+05	7.981+02	7.975+00	1.012+05
8	4.679+04	6.273+02	1.006+01	4.615+04
10	2.548+04	5.101+02	1.202+01	2.496+04
15	8.406+03	3.354+02	1.519+01	8.056+03
20	3.825+03	2.353+02	1.727+01	3.573+03
30	7.362+03	1.315+02	1.975+01	7.210+03
40	3.560+03	8.296+01	2.106+01	3.456+03
50	1.983+03	5.669+01	2.174+01	1.905+03
60	1.219+03	4.107+01	2.205+01	1.155+03
80	5.616+02	2.426+01	2.205+01	5.153+02
100	3.101+02	1.598+01	2.169+01	2.724+02
150	1.125+02	7.334+00	2.049+01	8.470+01
200	6.041+01	4.174+00	1.915+01	3.708+01
300	3.066+01	1.870+00	1.694+01	1.185+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.178+01	1.053+00	1.530+01	5.424+00	
500	1.773+01	6.740-01	1.403+01	3.026+00	
600	1.539+01	4.670-01	1.301+01	1.911+00	
800	1.268+01	2.610-01	1.146+01	9.619-01	
1000	1.106+01	1.650-01	1.031+01	5.859-01	
1500	8.887+00	7.416-02	8.392+00	2.784-01	1.429-01
2000	7.872+00	4.195-02	7.164+00	1.642-01	5.018-01
3000	7.046+00	1.875-02	5.638+00	8.908-02	1.301+00
4000	6.797+00	1.058-02	4.706+00	5.996-02	2.021+00
5000	6.769+00	6.782-03	4.061+00	4.411-02	2.657+00
6000	6.740+00	4.715-03	3.589+00	3.514-02	3.111+00
8000	6.955+00	2.656-03	2.935+00	2.454-02	3.993+00
10000	7.367+00	1.701-03	2.499+00	1.858-02	4.847+00
15000	8.037+00	7.571-04	1.849+00	1.203-02	6.175+00
20000	8.827+00	4.260-04	1.483+00	8.832-03	7.335+00
30000	9.877+00	1.896-04	1.079+00	5.716-03	8.792+00
40000	1.059+01	1.067-04	8.562-01	4.198-03	9.727+00
50000	1.124+01	6.794-05	7.142-01	3.304-03	1.052+01
60000	1.162+01	4.683-05	6.149-01	2.717-03	1.100+01
80000	1.230+01	2.591-05	4.845-01	1.995-03	1.181+01
100000	1.288+01	1.625-05	4.019-01	1.570-03	1.248+01

Z= 50 TIN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.101+06	1.583+03	1.013+00	2.100+06
1.5	7.427+05	1.503+03	1.876+00	7.412+05
2	3.555+05	1.415+03	2.724+00	3.541+05
3	1.262+05	1.241+03	4.295+00	1.250+05
4	1.841+05	1.083+03	5.708+00	1.830+05
5	1.712+05	9.472+02	6.981+00	1.702+05
6	1.073+05	8.318+02	8.145+00	1.064+05
8	5.061+04	6.545+02	1.023+01	4.995+04
10	2.796+04	5.318+02	1.219+01	2.742+04
15	9.323+03	3.500+02	1.542+01	8.958+03
20	4.224+03	2.466+02	1.755+01	3.960+03
30	8.100+03	1.381+02	2.008+01	7.942+03
40	3.843+03	8.708+01	2.142+01	3.734+03
50	2.119+03	5.950+01	2.212+01	2.037+03
60	1.294+03	4.311+01	2.244+01	1.228+03
80	5.928+02	2.548+01	2.245+01	5.449+02
100	3.266+02	1.678+01	2.210+01	2.877+02
150	1.182+02	7.702+00	2.089+01	8.960+01
200	6.327+01	4.383+00	1.953+01	3.936+01
300	3.188+01	1.963+00	1.728+01	1.263+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.251+01	1.106+00	1.561+01	5.796+00	
500	1.825+01	7.070-01	1.431+01	3.234+00	
600	1.580+01	4.900-01	1.327+01	2.040+00	
800	1.299+01	2.740-01	1.169+01	1.021+00	
1000	1.131+01	1.740-01	1.052+01	6.172-01	
1500	9.085+00	7.820-02	8.563+00	2.930-01	1.503-01
2000	8.053+00	4.425-02	7.311+00	1.727-01	5.250-01
3000	7.224+00	1.978-02	5.753+00	9.377-02	1.357+00
4000	6.982+00	1.116-02	4.802+00	6.307-02	2.105+00
5000	6.964+00	7.153-03	4.145+00	4.637-02	2.766+00
6000	6.942+00	4.973-03	3.663+00	3.692-02	3.237+00
8000	7.173+00	2.801-03	2.995+00	2.578-02	4.149+00
10000	7.605+00	1.794-03	2.551+00	1.950-02	5.033+00
15000	8.312+00	7.986-04	1.887+00	1.262-02	6.412+00
20000	9.139+00	4.493-04	1.513+00	9.267-03	7.616+00
30000	1.023+01	2.000-04	1.101+00	5.996-03	9.127+00
40000	1.098+01	1.126-04	8.738-01	4.402-03	1.010+01
50000	1.165+01	7.168-05	7.288-01	3.464-03	1.092+01
60000	1.205+01	4.941-05	6.275-01	2.848-03	1.142+01
80000	1.276+01	2.734-05	4.944-01	2.092-03	1.226+01
100000	1.336+01	1.715-05	4.102-01	1.646-03	1.295+01

Z= 51 ANTIMONY

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.252+06	1.647+03	9.894-01	2.251+06
1.5	8.001+05	1.562+03	1.863+00	7.986+05
2	3.843+05	1.469+03	2.749+00	3.828+05
3	1.371+05	1.285+03	4.397+00	1.358+05
4	6.625+04	1.123+03	5.857+00	6.512+04
5	1.810+05	9.836+02	7.152+00	1.800+05
6	1.145+05	8.655+02	8.325+00	1.136+05
8	5.463+04	6.823+02	1.041+01	5.393+04
10	3.035+04	5.540+02	1.222+01	2.978+04
15	1.015+04	3.648+02	1.556+01	9.766+03
20	4.581+03	2.580+02	1.775+01	4.305+03
30	1.470+03	1.449+02	2.036+01	1.304+03
40	4.175+03	9.139+01	2.174+01	4.062+03
50	2.356+03	6.246+01	2.247+01	2.271+03
60	1.453+03	4.527+01	2.282+01	1.385+03
80	6.670+02	2.677+01	2.284+01	6.174+02
100	3.646+02	1.764+01	2.249+01	3.245+02
150	1.285+02	8.094+00	2.129+01	9.909+01
200	6.731+01	4.607+00	1.990+01	4.280+01
300	3.319+01	2.063+00	1.762+01	1.350+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.326+01	1.162+00	1.591+01	6.184+00	
500	1.881+01	7.430-01	1.459+01	3.478+00	
600	1.628+01	5.150-01	1.353+01	2.227+00	
800	1.337+01	2.870-01	1.192+01	1.160+00	
1000	1.165+01	1.830-01	1.073+01	7.361-01	
1500	9.324+00	8.226-02	8.734+00	3.493-01	1.581-01
2000	8.259+00	4.654-02	7.457+00	2.058-01	5.497-01
3000	7.416+00	2.080-02	5.868+00	1.116-01	1.415+00
4000	7.176+00	1.173-02	4.898+00	7.502-02	2.191+00
5000	7.166+00	7.524-03	4.227+00	5.513-02	2.877+00
6000	7.149+00	5.231-03	3.736+00	4.389-02	3.364+00
8000	7.397+00	2.947-03	3.055+00	3.062-02	4.308+00
10000	7.849+00	1.888-03	2.602+00	2.316-02	5.223+00
15000	8.592+00	8.401-04	1.924+00	1.499-02	6.651+00
20000	9.454+00	4.727-04	1.544+00	1.100-02	7.899+00
30000	1.060+01	2.104-04	1.123+00	7.120-03	9.466+00
40000	1.137+01	1.184-04	8.912-01	5.228-03	1.047+01
50000	1.207+01	7.542-05	7.434-01	4.114-03	1.133+01
60000	1.249+01	5.199-05	6.401-01	3.382-03	1.185+01
80000	1.322+01	2.877-05	5.043-01	2.483-03	1.272+01
100000	1.385+01	1.806-05	4.184-01	1.954-03	1.343+01

Z= 52 TELLURIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.337+06	1.712+03	9.055-01	2.335+06
1.5	8.760+05	1.624+03	1.785+00	8.744+05
2	4.222+05	1.525+03	2.701+00	4.207+05
3	1.513+05	1.332+03	4.446+00	1.500+05
4	7.334+04	1.163+03	5.968+00	7.217+04
5	1.999+05	1.020+03	7.305+00	1.989+05
6	1.248+05	8.993+02	8.496+00	1.239+05
8	5.872+04	7.106+02	1.060+01	5.800+04
10	3.244+04	5.770+02	1.256+01	3.185+04
15	1.086+04	3.798+02	1.593+01	1.047+04
20	4.954+03	2.696+02	1.814+01	4.666+03
30	1.628+03	1.520+02	2.074+01	1.455+03
40	4.350+03	9.588+01	2.213+01	4.232+03
50	2.423+03	6.556+01	2.286+01	2.334+03
60	1.487+03	4.754+01	2.321+01	1.416+03
80	6.832+02	2.813+01	2.325+01	6.318+02
100	3.752+02	1.854+01	2.250+01	3.342+02
150	1.343+02	8.511+00	2.169+01	1.041+02
200	7.090+01	4.845+00	2.028+01	4.578+01
300	3.490+01	2.170+00	1.796+01	1.477+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.428+01	1.223+00	1.622+01	6.837+00	
500	1.952+01	7.820-01	1.488+01	3.858+00	
600	1.681+01	5.420-01	1.380+01	2.465+00	
800	1.372+01	3.030-01	1.215+01	1.269+00	
1000	1.192+01	1.920-01	1.094+01	7.893-01	
1500	9.532+00	8.631-02	8.905+00	3.744-01	1.662-01
2000	8.448+00	4.884-02	7.603+00	2.206-01	5.750-01
3000	7.600+00	2.183-02	5.984+00	1.194-01	1.475+00
4000	7.367+00	1.232-02	4.995+00	8.022-02	2.280+00
5000	7.366+00	7.895-03	4.311+00	5.892-02	2.989+00
6000	7.355+00	5.489-03	3.810+00	4.689-02	3.493+00
8000	7.621+00	3.092-03	3.115+00	3.271-02	4.470+00
10000	8.094+00	1.981-03	2.653+00	2.473-02	5.415+00
15000	8.873+00	8.816-04	1.962+00	1.600-02	6.894+00
20000	9.771+00	4.961-04	1.574+00	1.175-02	8.185+00
30000	1.096+01	2.208-04	1.145+00	7.601-03	9.811+00
40000	1.177+01	1.243-04	9.088-01	5.581-03	1.085+01
50000	1.250+01	7.917-05	7.580-01	4.392-03	1.174+01
60000	1.293+01	5.458-05	6.527-01	3.611-03	1.228+01
80000	1.369+01	3.021-05	5.142-01	2.651-03	1.318+01
100000	1.435+01	1.896-05	4.266-01	2.086-03	1.392+01

TABLE III. CONT.

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 53 IODINE

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.426+06	1.780+03	8.946-01	2.424+06	
1.5	9.321+05	1.689+03	1.780+00	9.304+05	
2	4.572+05	1.585+03	2.715+00	4.556+05	
3	1.679+05	1.381+03	4.521+00	1.666+05	
4	8.277+04	1.205+03	6.100+00	8.156+04	
5	1.872+05	1.057+03	7.476+00	1.861+05	
6	1.340+05	9.335+02	8.686+00	1.330+05	
8	6.232+04	7.395+02	1.080+01	6.157+04	
10	3.428+04	6.005+02	1.267+01	3.367+04	
15	1.151+04	3.951+02	1.608+01	1.110+04	
20	5.302+03	2.814+02	1.835+01	5.002+03	
30	1.783+03	1.592+02	2.104+01	1.603+03	
40	4.720+03	1.006+02	2.247+01	4.597+03	
50	2.636+03	6.882+01	2.323+01	2.544+03	
60	1.622+03	4.993+01	2.359+01	1.548+03	
80	7.478+02	2.956+01	2.364+01	6.946+02	
100	4.119+02	1.950+01	2.330+01	3.691+02	
150	1.469+02	8.954+00	2.208+01	1.159+02	
200	7.688+01	5.098+00	2.066+01	5.113+01	
300	3.711+01	2.284+00	1.830+01	1.652+01	
400	2.545+01	1.287+00	1.653+01	7.629+00	
500	2.027+01	8.230-01	1.516+01	4.285+00	
600	1.735+01	5.700-01	1.406+01	2.723+00	
800	1.409+01	3.190-01	1.239+01	1.383+00	
1000	1.220+01	2.020-01	1.115+01	8.488-01	
1500	9.745+00	9.081-02	9.077+00	4.024-01	1.747-01
2000	8.639+00	5.138-02	7.750+00	2.370-01	6.011-01
3000	7.786+00	2.297-02	6.099+00	1.282-01	1.536+00
4000	7.559+00	1.296-02	5.091+00	8.604-02	2.369+00
5000	7.569+00	8.308-03	4.394+00	6.316-02	3.104+00
6000	7.564+00	5.776-03	3.883+00	5.025-02	3.625+00
8000	7.848+00	3.254-03	3.176+00	3.503-02	4.634+00
10000	8.342+00	2.085-03	2.704+00	2.648-02	5.610+00
15000	9.159+00	9.277-04	2.000+00	1.713-02	7.141+00
20000	1.009+01	5.220-04	1.604+00	1.258-02	8.476+00
30000	1.134+01	2.323-04	1.167+00	8.138-03	1.016+01
40000	1.217+01	1.308-04	9.263-01	5.975-03	1.124+01
50000	1.293+01	8.332-05	7.726-01	4.702-03	1.216+01
60000	1.338+01	5.745-05	6.653-01	3.866-03	1.271+01
80000	1.417+01	3.180-05	5.241-01	2.838-03	1.365+01
100000	1.485+01	1.997-05	4.349-01	2.233-03	1.442+01

Z= 54 XENON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.452+06	1.850+03	9.421-01	2.450+06	
1.5	9.540+05	1.755+03	1.839+00	9.523+05	
2	4.722+05	1.648+03	2.788+00	4.705+05	
3	1.756+05	1.433+03	4.610+00	1.742+05	
4	8.732+04	1.248+03	6.254+00	8.607+04	
5	1.437+05	1.095+03	7.664+00	1.426+05	
6	1.460+05	9.679+02	8.895+00	1.450+05	
8	6.847+04	7.687+02	1.101+01	6.769+04	
10	3.777+04	6.248+02	1.283+01	3.713+04	
15	1.263+04	4.106+02	1.630+01	1.220+04	
20	5.757+03	2.933+02	1.861+01	5.445+03	
30	1.893+03	1.667+02	2.135+01	1.705+03	
40	4.872+03	1.054+02	2.281+01	4.744+03	
50	2.741+03	7.222+01	2.359+01	2.645+03	
60	1.693+03	5.243+01	2.397+01	1.617+03	
80	7.830+02	3.107+01	2.404+01	7.279+02	
100	4.313+02	2.050+01	2.370+01	3.871+02	
150	1.534+02	9.423+00	2.247+01	1.215+02	
200	7.996+01	5.366+00	2.103+01	5.356+01	
300	3.838+01	2.405+00	1.864+01	1.734+01	
400	2.624+01	1.355+00	1.684+01	8.043+00	
500	2.086+01	8.660-01	1.544+01	4.547+00	
600	1.784+01	6.010-01	1.432+01	2.912+00	
800	1.446+01	3.350-01	1.262+01	1.505+00	
1000	1.251+01	2.130-01	1.136+01	9.402-01	
1500	9.973+00	9.576-02	9.248+00	4.456-01	1.833-01
2000	8.841+00	5.418-02	7.896+00	2.624-01	6.279-01
3000	7.979+00	2.422-02	6.214+00	1.417-01	1.598+00
4000	7.757+00	1.366-02	5.187+00	9.504-02	2.461+00
5000	7.776+00	8.762-03	4.477+00	6.974-02	3.220+00
6000	7.777+00	6.092-03	3.957+00	5.547-02	3.759+00
8000	8.079+00	3.432-03	3.236+00	3.865-02	4.801+00
10000	8.594+00	2.198-03	2.755+00	2.921-02	5.808+00
15000	9.449+00	9.784-04	2.038+00	1.889-02	7.391+00
20000	1.042+01	5.505-04	1.635+00	1.387-02	8.771+00
30000	1.171+01	2.450-04	1.189+00	8.975-03	1.051+01
40000	1.258+01	1.379-04	9.439-01	6.589-03	1.163+01
50000	1.337+01	8.790-05	7.873-01	5.185-03	1.258+01
60000	1.384+01	6.061-05	6.779-01	4.263-03	1.316+01
80000	1.466+01	3.356-05	5.341-01	3.130-03	1.412+01
100000	1.537+01	2.107-05	4.431-01	2.463-03	1.492+01

Z= 55 CESIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.163+06	1.897+03	1.274+00	2.161+06	
1.5	1.140+06	1.796+03	2.165+00	1.138+06	
2	5.511+05	1.689+03	3.082+00	5.494+05	
3	1.983+05	1.476+03	4.856+00	1.968+05	
4	9.632+04	1.287+03	6.489+00	9.503+04	
5	5.515+04	1.130+03	7.912+00	5.402+04	
6	1.563+05	9.999+02	9.153+00	1.553+05	
8	7.278+04	7.966+02	1.127+01	7.198+04	
10	4.005+04	6.484+02	1.308+01	3.939+04	
15	1.343+04	4.261+02	1.656+01	1.299+04	
20	6.174+03	3.051+02	1.891+01	5.850+03	
30	2.068+03	1.743+02	2.169+01	1.872+03	
40	5.206+03	1.105+02	2.317+01	5.073+03	
50	2.927+03	7.581+01	2.397+01	2.827+03	
60	1.808+03	5.509+01	2.436+01	1.728+03	
80	8.362+02	3.268+01	2.443+01	7.790+02	
100	4.606+02	2.158+01	2.410+01	4.149+02	
150	1.634+02	9.929+00	2.287+01	1.306+02	
200	8.482+01	5.657+00	2.141+01	5.776+01	
300	4.028+01	2.536+00	1.898+01	1.877+01	
400	2.730+01	1.429+00	1.715+01	8.724+00	
500	2.158+01	9.140-01	1.573+01	4.938+00	
600	1.839+01	6.330-01	1.459+01	3.164+00	
800	1.484+01	3.550-01	1.285+01	1.635+00	
1000	1.282+01	2.250-01	1.157+01	1.021+00	
1500	1.020+01	1.012-01	9.419+00	4.837-01	1.923-01
2000	9.040+00	5.724-02	8.043+00	2.847-01	6.554-01
3000	8.171+00	2.559-02	6.330+00	1.535-01	1.662+00
4000	7.955+00	1.444-02	5.284+00	1.029-01	2.554+00
5000	7.984+00	9.257-03	4.560+00	7.548-02	3.339+00
6000	7.992+00	6.436-03	4.030+00	6.002-02	3.896+00
8000	8.312+00	3.626-03	3.296+00	4.180-02	4.971+00
10000	8.849+00	2.323-03	2.806+00	3.158-02	6.008+00
15000	9.741+00	1.034-03	2.076+00	2.043-02	7.644+00
20000	1.075+01	5.817-04	1.665+00	1.500-02	9.070+00
30000	1.210+01	2.588-04	1.211+00	9.703-03	1.087+01
40000	1.300+01	1.457-04	9.614-01	7.123-03	1.203+01
50000	1.382+01	9.289-05	8.019-01	5.605-03	1.301+01
60000	1.430+01	6.405-05	6.905-01	4.608-03	1.361+01
80000	1.515+01	3.547-05	5.440-01	3.383-03	1.460+01
100000	1.588+01	2.228-05	4.513-01	2.662-03	1.543+01

Z= 56 BARIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.405+06	1.955+03	1.514+00	2.403+06	
1.5	1.260+06	1.843+03	2.470+00	1.258+06	
2	6.034+05	1.730+03	3.386+00	6.017+05	
3	2.143+05	1.516+03	5.130+00	2.128+05	
4	1.031+05	1.326+03	6.744+00	1.018+05	
5	5.863+04	1.165+03	8.175+00	5.745+04	
6	1.665+05	1.032+03	9.426+00	1.654+05	
8	7.772+04	8.241+02	1.154+01	7.689+04	
10	4.290+04	6.721+02	1.334+01	4.222+04	
15	1.450+04	4.417+02	1.683+01	1.404+04	
20	6.708+03	3.169+02	1.921+01	6.372+03	
30	2.270+03	1.820+02	2.203+01	2.066+03	
40	5.596+03	1.157+02	2.353+01	5.456+03	
50	3.173+03	7.947+01	2.434+01	3.069+03	
60	1.968+03	5.780+01	2.474+01	1.885+03	
80	9.116+02	3.431+01	2.483+01	8.525+02	
100	5.011+02	2.268+01	2.450+01	4.539+02	
150	1.760+02	1.045+01	2.326+01	1.422+02	
200	9.032+01	5.955+00	2.178+01	6.258+01	
300	4.219+01	2.671+00	1.931+01	2.020+01	
400	2.833+01	1.504+00	1.746+01	9.371+00	
500	2.228+01	9.630-01	1.601+01	5.306+00	
600	1.893+01	6.670-01	1.485+01	3.407+00	
800	1.523+01	3.730-01	1.308+01	1.774+00	
1000	1.314+01	2.370-01	1.178+01	1.119+00	
1500	1.043+01	1.066-01	9.592+00	5.299-01	2.015-01
2000	9.246+00	6.030-02	8.190+00	3.118-01	6.837-01
3000	8.368+00	2.696-02	6.446+00	1.679-01	1.727+00
4000	8.157+00	1.521-02	5.381+00	1.125-01	2.649+00
5000	8.196+00	9.753-03	4.643+00	8.246-02	3.460+00
6000	8.211+00	6.781-03	4.104+00	6.555-02	4.034+00
8000	8.548+00	3.820-03	3.356+00	4.563-02	5.143+00
10000	9.107+00	2.447-03	2.858+00	3.446-02	6.212+00
15000	1.004+01	1.089-03	2.114+00	2.229-02	7.901+00
20000	1.109+01	6.128-04	1.696+00	1.637-02	9.373+00
30000	1.248+01	2.727-04	1.233+00	1.059-02	1.124+01
40000	1.342+01	1.535-04	9.791-01	7.772-03	1.243+01
50000	1.427+01	9.788-05	8.166-01	6.115-03	1.344+01
60000	1.477+01	6.751-05	7.031-01	5.028-03	1.406+01
80000	1.565+01	3.739-05	5.540-01	3.691-03	1.509+01
100000	1.641+01	2.348-05	4.596-01	2.904-03	1.595+01

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 57 LANTHANUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.628+06	2.028+03	1.603+00	2.626+06
1.5	1.384+06	1.909+03	2.579+00	1.382+06
2	6.592+05	1.789+03	3.491+00	6.574+05
3	2.322+05	1.564+03	5.237+00	2.307+05
4	1.111+05	1.368+03	6.845+00	1.097+05
5	6.287+04	1.202+03	8.287+00	6.166+04
6	1.492+05	1.065+03	9.550+00	1.481+05
8	8.261+04	8.528+02	1.168+01	8.175+04
10	4.615+04	6.967+02	1.308+01	4.544+04
15	1.573+04	4.579+02	1.663+01	1.525+04
20	7.240+03	3.290+02	1.914+01	6.892+03
30	2.401+03	1.900+02	2.221+01	2.189+03
40	5.965+03	1.212+02	2.380+01	5.820+03
50	3.375+03	8.338+01	2.466+01	3.267+03
60	2.092+03	6.071+01	2.509+01	2.006+03
80	9.698+02	3.607+01	2.521+01	9.085+02
100	5.338+02	2.387+01	2.488+01	4.850+02
150	1.877+02	1.101+01	2.365+01	1.530+02
200	9.609+01	6.279+00	2.216+01	6.765+01
300	4.442+01	2.817+00	1.965+01	2.195+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	2.954+01	1.588+00	1.776+01	1.020+01	
500	2.308+01	1.016+00	1.629+01	5.770+00	
600	1.951+01	7.040-01	1.511+01	3.696+00	
800	1.563+01	3.940-01	1.332+01	1.912+00	
1000	1.344+01	2.500-01	1.199+01	1.195+00	
1500	1.065+01	1.124-01	9.763+00	5.657-01	2.110-01
2000	9.445+00	6.361-02	8.336+00	3.327-01	7.126-01
3000	8.562+00	2.844-02	6.561+00	1.789-01	1.794+00
4000	8.359+00	1.605-02	5.477+00	1.198-01	2.746+00
5000	8.408+00	1.029-02	4.727+00	8.777-02	3.583+00
6000	8.430+00	7.154-03	4.178+00	6.975-02	4.175+00
8000	8.786+00	4.030-03	3.416+00	4.853-02	5.318+00
10000	9.367+00	2.582-03	2.909+00	3.663-02	6.418+00
15000	1.034+01	1.149-03	2.152+00	2.370-02	8.161+00
20000	1.142+01	6.465-04	1.726+00	1.740-02	9.680+00
30000	1.287+01	2.877-04	1.255+00	1.125-02	1.161+01
40000	1.385+01	1.620-04	9.966-01	8.262-03	1.284+01
50000	1.472+01	1.033-04	8.312-01	6.501-03	1.388+01
60000	1.524+01	7.124-05	7.157-01	5.345-03	1.452+01
80000	1.616+01	3.946-05	5.639-01	3.924-03	1.559+01
100000	1.694+01	2.479-05	4.679-01	3.087-03	1.647+01

Z= 58 CERIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.836+06	2.107+03	1.657+00	2.834+06
1.5	1.504+06	1.992+03	2.647+00	1.502+06
2	7.167+05	1.874+03	3.557+00	7.148+05
3	2.526+05	1.648+03	5.302+00	2.509+05
4	1.208+05	1.444+03	6.909+00	1.194+05
5	6.839+04	1.269+03	8.363+00	6.711+04
6	1.159+05	1.123+03	9.639+00	1.147+05
8	8.930+04	8.970+02	1.179+01	8.840+04
10	4.968+04	7.312+02	1.318+01	4.894+04
15	1.693+04	4.788+02	1.677+01	1.644+04
20	7.843+03	3.437+02	1.934+01	7.480+03
30	2.643+03	1.991+02	2.249+01	2.422+03
40	1.225+03	1.273+02	2.413+01	1.074+03
50	3.665+03	8.779+01	2.502+01	3.552+03
60	2.271+03	6.399+01	2.546+01	2.182+03
80	1.050+03	3.804+01	2.559+01	9.866+02
100	5.757+02	2.519+01	2.528+01	5.253+02
150	2.003+02	1.164+01	2.405+01	1.646+02
200	1.016+02	6.641+00	2.253+01	7.247+01
300	4.639+01	2.981+00	1.998+01	2.343+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.064+01	1.680+00	1.807+01	1.089+01	
500	2.383+01	1.075+00	1.658+01	6.180+00	
600	2.010+01	7.450-01	1.538+01	3.976+00	
800	1.604+01	4.170-01	1.354+01	2.080+00	
1000	1.378+01	2.650-01	1.220+01	1.318+00	
1500	1.090+01	1.192-01	9.934+00	6.236-01	2.208-01
2000	9.659+00	6.743-02	8.483+00	3.667-01	7.423-01
3000	8.765+00	3.015-02	6.677+00	1.969-01	1.861+00
4000	8.568+00	1.701-02	5.573+00	1.318-01	2.846+00
5000	8.625+00	1.091-02	4.810+00	9.648-02	3.708+00
6000	8.654+00	7.584-03	4.251+00	7.665-02	4.318+00
8000	9.029+00	4.273-03	3.476+00	5.331-02	5.495+00
10000	9.631+00	2.737-03	2.960+00	4.023-02	6.627+00
15000	1.064+01	1.218-03	2.190+00	2.602-02	8.425+00
20000	1.177+01	6.854-04	1.757+00	1.910-02	9.990+00
30000	1.327+01	3.050-04	1.277+00	1.236-02	1.198+01
40000	1.428+01	1.717-04	1.014+00	9.071-03	1.325+01
50000	1.518+01	1.095-04	8.459-01	7.137-03	1.433+01
60000	1.572+01	7.555-05	7.283-01	5.867-03	1.499+01
80000	1.667+01	4.185-05	5.738-01	4.307-03	1.609+01
100000	1.748+01	2.630-05	4.761-01	3.389-03	1.700+01

Z= 59 PRASEODYMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	3.018+06	2.184+03	1.673+00	3.015+06
1.5	1.527+06	2.068+03	2.671+00	1.525+06
2	7.733+05	1.949+03	3.581+00	7.714+05
3	2.737+05	1.717+03	5.328+00	2.720+05
4	1.313+05	1.506+03	6.939+00	1.298+05
5	7.449+04	1.325+03	8.404+00	7.315+04
6	1.246+05	1.173+03	9.695+00	1.234+05
8	9.538+04	9.362+02	1.187+01	9.443+04
10	5.280+04	7.630+02	1.327+01	5.202+04
15	1.785+04	4.986+02	1.692+01	1.734+04
20	8.230+03	3.579+02	1.954+01	7.853+03
30	2.759+03	2.081+02	2.277+01	2.528+03
40	1.276+03	1.336+02	2.445+01	1.118+03
50	3.734+03	9.229+01	2.537+01	3.616+03
60	2.327+03	6.735+01	2.583+01	2.233+03
80	1.097+03	4.006+01	2.598+01	1.021+03
100	6.009+02	2.656+01	2.567+01	5.487+02
150	2.118+02	1.229+01	2.444+01	1.751+02
200	1.079+02	7.017+00	2.291+01	7.796+01
300	4.899+01	3.151+00	2.032+01	2.552+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.207+01	1.777+00	1.838+01	1.191+01	
500	2.475+01	1.137+00	1.686+01	6.757+00	
600	2.076+01	7.880-01	1.564+01	4.336+00	
800	1.646+01	4.410-01	1.377+01	2.245+00	
1000	1.409+01	2.800-01	1.241+01	1.404+00	
1500	1.113+01	1.259-01	1.011+01	6.640-01	2.309-01
2000	9.863+00	7.126-02	8.629+00	3.904-01	7.728-01
3000	8.964+00	3.186-02	6.792+00	2.093-01	1.931+00
4000	8.774+00	1.798-02	5.670+00	1.400-01	2.946+00
5000	8.842+00	1.153-02	4.893+00	1.024-01	3.835+00
6000	8.878+00	8.015-03	4.325+00	8.135-02	4.464+00
8000	9.272+00	4.515-03	3.537+00	5.655-02	5.675+00
10000	9.896+00	2.893-03	3.011+00	4.256-02	6.839+00
15000	1.095+01	1.287-03	2.228+00	2.759-02	8.692+00
20000	1.211+01	7.244-04	1.787+00	2.026-02	1.030+01
30000	1.367+01	3.223-04	1.300+00	1.310-02	1.236+01
40000	1.471+01	1.815-04	1.032+00	9.618-03	1.367+01
50000	1.565+01	1.158-04	8.605-01	7.567-03	1.478+01
60000	1.621+01	7.986-05	7.409-01	6.221-03	1.546+01
80000	1.718+01	4.425-05	5.838-01	4.567-03	1.660+01
100000	1.802+01	2.781-05	4.843-01	3.593-03	1.753+01

Z= 60 NEODYMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	2.218+06	2.264+03	1.654+00	2.216+06
1.5	1.670+06	2.147+03	2.652+00	1.667+06
2	8.410+05	2.025+03	3.564+00	8.390+05
3	2.953+05	1.788+03	5.317+00	2.935+05
4	1.409+05	1.571+03	6.935+00	1.393+05
5	7.957+04	1.382+03	8.412+00	7.818+04
6	4.999+04	1.224+03	9.719+00	4.875+04
8	1.015+05	9.772+02	1.192+01	1.005+05
10	5.654+04	7.962+02	1.337+01	5.573+04
15	1.920+04	5.193+02	1.708+01	1.867+04
20	8.833+03	3.724+02	1.975+01	8.441+03
30	2.932+03	2.173+02	2.305+01	2.692+03
40	1.341+03	1.400+02	2.478+01	1.176+03
50	3.964+03	9.694+01	2.572+01	3.842+03
60	2.467+03	7.084+01	2.620+01	2.370+03
80	1.152+03	4.216+01	2.636+01	1.084+03
100	6.377+02	2.798+01	2.606+01	5.836+02
150	2.251+02	1.297+01	2.483+01	1.873+02
200	1.145+02	7.410+00	2.328+01	8.378+01
300	5.156+01	3.329+00	2.065+01	2.758+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.346+01	1.877+00	1.868+01	1.290+01	
500	2.567+01	1.202+00	1.714+01	7.324+00	
600	2.143+01	8.330-01	1.590+01	4.695+00	
800	1.689+01	4.660-01	1.400+01	2.421+00	
1000	1.442+01	2.960-01	1.262+01	1.504+00	
1500	1.136+01	1.331-01	1.028+01	7.110-01	2.413-01
2000	1.007+01	7.533-02	8.776+00	4.179-01	8.040-01
3000	9.167+00	3.369-02	6.908+00	2.238-01	2.002+00
4000	8.984+00	1.901-02	5.767+00	1.495-01	3.049+00
5000	9.063+00	1.219-02	4.977+00	1.094-01	3.965+00
6000	9.105+00	8.474-03	4.399+00	8.683-02	4.612+00
8000	9.519+00	4.774-03	3.597+00	6.033-02	5.857+00
10000	1.017+01	3.059-03	3.063+00	4.549-02	7.054+00
15000	1.126+01	1.361-03	2.266+00	2.942-02	8.962+00
20000	1.246+01	7.659-04	1.817+00	2.160-02	1.062+01
30000	1.408+01	3.408-04	1.322+00	1.397-02	1.274+01
40000	1.515+01	1.919-04	1.049+00	1.025-02	1.410+01
50000	1.612+01	1.224-04	8.752-01	8.068-03	1.524+01
60000	1.670+01	8.446-05	7.536-01	6.633-03	1.594+01
80000	1.771+01	4.681-05	5.937-01	4.869-03	1.711+01
100000	1.857+01	2.942-05	4.926-01	3.831-03	1.808+01

ENDF/B IN BARNS/ATOM

Z= 61 PROMETHIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	6.274+05	2.344+03	1.602+00	6.250+05
1.5	1.800+06	2.226+03	2.593+00	1.798+06
2	9.051+05	2.103+03	3.508+00	9.030+05
3	3.170+05	1.861+03	5.270+00	3.152+05
4	1.510+05	1.638+03	6.899+00	1.493+05
5	8.512+04	1.442+03	8.388+00	8.367+04
6	5.340+04	1.277+03	9.711+00	5.212+04
8	1.091+05	1.020+03	1.195+01	1.081+05
10	6.038+04	8.308+02	1.348+01	5.954+04
15	2.038+04	5.409+02	1.724+01	1.983+04
20	9.378+03	3.875+02	1.996+01	8.971+03
30	3.131+03	2.269+02	2.333+01	2.881+03
40	1.442+03	1.467+02	2.510+01	1.270+03
50	4.201+03	1.018+02	2.607+01	4.073+03
60	2.619+03	7.454+01	2.656+01	2.518+03
80	1.225+03	4.437+01	2.675+01	1.153+03
100	6.775+02	2.948+01	2.645+01	6.215+02
150	2.383+02	1.369+01	2.522+01	1.994+02
200	1.207+02	7.826+00	2.365+01	9.921+01
300	5.389+01	3.518+00	2.099+01	2.938+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.474+01	1.985+00	1.899+01	1.377+01	
500	2.653+01	1.270+00	1.743+01	7.830+00	
600	2.208+01	8.800-01	1.617+01	5.033+00	
800	1.733+01	4.930-01	1.423+01	2.610+00	
1000	1.478+01	3.130-01	1.283+01	1.633+00	
1500	1.161+01	1.408-01	1.045+01	7.717-01	2.519-01
2000	1.029+01	7.967-02	8.923+00	4.534-01	8.360-01
3000	9.375+00	3.563-02	7.023+00	2.425-01	2.074+00
4000	9.198+00	2.010-02	5.863+00	1.619-01	3.153+00
5000	9.287+00	1.289-02	5.060+00	1.183-01	4.096+00
6000	9.337+00	8.962-03	4.472+00	9.393-02	4.762+00
8000	9.769+00	5.049-03	3.657+00	6.523-02	6.042+00
10000	1.044+01	3.235-03	3.114+00	4.916-02	7.271+00
15000	1.157+01	1.440-03	2.303+00	3.180-02	9.236+00
20000	1.282+01	8.101-04	1.848+00	2.334-02	1.095+01
30000	1.449+01	3.605-04	1.344+00	1.510-02	1.313+01
40000	1.560+01	2.030-04	1.067+00	1.108-02	1.452+01
50000	1.660+01	1.295-04	8.899-01	8.719-03	1.571+01
60000	1.720+01	8.935-05	7.662-01	7.168-03	1.642+01
80000	1.824+01	4.952-05	6.037-01	5.262-03	1.763+01
100000	1.913+01	3.113-05	5.008-01	4.140-03	1.863+01

Z= 62 SAMARIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	6.696+05	2.426+03	1.521+00	6.672+05
1.5	1.768+06	2.307+03	2.498+00	1.766+06
2	9.762+05	2.182+03	3.418+00	9.740+05
3	3.395+05	1.936+03	5.191+00	3.376+05
4	1.609+05	1.706+03	6.833+00	1.592+05
5	9.036+04	1.504+03	8.334+00	8.885+04
6	5.652+04	1.333+03	9.674+00	5.517+04
8	1.148+05	1.064+03	1.196+01	1.137+05
10	6.379+04	8.669+02	1.359+01	6.291+04
15	2.170+04	5.634+02	1.741+01	2.112+04
20	1.005+04	4.032+02	2.017+01	9.622+03
30	3.384+03	2.367+02	2.361+01	3.123+03
40	1.568+03	1.537+02	2.543+01	1.389+03
50	4.461+03	1.070+02	2.641+01	4.328+03
60	2.772+03	7.841+01	2.693+01	2.667+03
80	1.292+03	4.669+01	2.713+01	1.218+03
100	7.135+02	3.105+01	2.684+01	6.556+02
150	2.506+02	1.444+01	2.561+01	2.106+02
200	1.267+02	8.264+00	2.402+01	9.439+01
300	5.627+01	3.718+00	2.132+01	3.124+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.609+01	2.097+00	1.930+01	1.469+01	
500	2.744+01	1.343+00	1.771+01	8.383+00	
600	2.276+01	9.300-01	1.643+01	5.401+00	
800	1.780+01	5.210-01	1.447+01	2.811+00	
1000	1.513+01	3.310-01	1.304+01	1.762+00	
1500	1.186+01	1.489-01	1.062+01	8.323-01	2.629-01
2000	1.051+01	8.426-02	9.069+00	4.889-01	8.687-01
3000	9.585+00	3.768-02	7.138+00	2.610-01	2.147+00
4000	9.414+00	2.126-02	5.960+00	1.742-01	3.259+00
5000	9.513+00	1.363-02	5.143+00	1.273-01	4.229+00
6000	9.569+00	9.479-03	4.545+00	1.010-01	4.914+00
8000	1.002+01	5.341-03	3.717+00	7.009-02	6.229+00
10000	1.071+01	3.421-03	3.165+00	5.280-02	7.491+00
15000	1.189+01	1.523-03	2.341+00	3.415-02	9.513+00
20000	1.317+01	8.568-04	1.878+00	2.507-02	1.127+01
30000	1.491+01	3.812-04	1.366+00	1.621-02	1.352+01
40000	1.605+01	2.147-04	1.084+00	1.190-02	1.496+01
50000	1.709+01	1.370-04	9.045-01	9.363-03	1.617+01
60000	1.770+01	9.454-05	7.788-01	7.697-03	1.692+01
80000	1.878+01	5.240-05	6.136-01	5.650-03	1.816+01
100000	1.970+01	3.295-05	5.091-01	4.445-03	1.918+01

Z= 63 EUROPIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	7.194+05	2.509+03	1.418+00	7.169+05
1.5	1.931+06	2.390+03	2.374+00	1.929+06
2	1.069+06	2.263+03	3.298+00	1.067+06
3	3.685+05	2.012+03	5.082+00	3.665+05
4	1.735+05	1.777+03	6.741+00	1.717+05
5	9.696+04	1.568+03	8.252+00	9.539+04
6	6.040+04	1.390+03	9.609+00	5.900+04
8	1.069+05	1.110+03	1.194+01	1.058+05
10	6.847+04	9.043+02	1.390+01	6.755+04
15	2.317+04	5.868+02	1.777+01	2.256+04
20	1.071+04	4.194+02	2.060+01	1.027+04
30	3.617+03	2.468+02	2.401+01	3.346+03
40	1.683+03	1.608+02	2.582+01	1.496+03
50	4.712+03	1.122+02	2.680+01	4.573+03
60	2.940+03	8.242+01	2.732+01	2.830+03
80	1.376+03	4.908+01	2.752+01	1.300+03
100	7.619+02	3.268+01	2.724+01	7.020+02
150	2.675+02	1.522+01	2.600+01	2.263+02
200	1.347+02	8.719+00	2.440+01	1.016+02
300	5.924+01	3.925+00	2.167+01	3.364+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.763+01	2.215+00	1.960+01	1.581+01	
500	2.843+01	1.418+00	1.799+01	9.019+00	
600	2.348+01	9.820-01	1.669+01	5.808+00	
800	1.828+01	5.500-01	1.471+01	3.020+00	
1000	1.549+01	3.500-01	1.325+01	1.891+00	
1500	1.212+01	1.574-01	1.079+01	8.929-01	2.742-01
2000	1.073+01	8.910-02	9.216+00	5.243-01	9.023-01
3000	9.796+00	3.985-02	7.254+00	2.795-01	2.222+00
4000	9.633+00	2.249-02	6.056+00	1.864-01	3.368+00
5000	9.742+00	1.442-02	5.227+00	1.361-01	4.365+00
6000	9.805+00	1.002-02	4.619+00	1.080-01	5.068+00
8000	1.028+01	5.648-03	3.778+00	7.490-02	6.419+00
10000	1.099+01	3.618-03	3.217+00	5.640-02	7.714+00
15000	1.221+01	1.610-03	2.380+00	3.648-02	9.792+00
20000	1.354+01	9.061-04	1.909+00	2.678-02	1.160+01
30000	1.533+01	4.032-04	1.388+00	1.732-02	1.392+01
40000	1.651+01	2.271-04	1.102+00	1.271-02	1.540+01
50000	1.759+01	1.449-04	9.192-01	1.000-02	1.665+01
60000	1.821+01	1.000-04	7.915-01	8.221-03	1.741+01
80000	1.932+01	5.544-05	6.236-01	6.035-03	1.869+01
100000	2.027+01	3.486-05	5.174-01	4.748-03	1.974+01

Z= 64 GADOLINIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	7.658+05	2.591+03	1.404+00	7.632+05
1.5	1.491+06	2.466+03	2.351+00	1.489+06
2	1.099+06	2.333+03	3.271+00	1.097+06
3	3.829+05	2.073+03	5.056+00	3.809+05
4	1.817+05	1.832+03	6.721+00	1.798+05
5	1.021+05	1.619+03	8.239+00	1.005+05
6	6.390+04	1.437+03	9.606+00	6.245+04
8	1.130+05	1.150+03	1.195+01	1.118+05
10	7.245+04	9.381+02	1.377+01	7.150+04
15	2.458+04	6.089+02	1.771+01	2.395+04
20	1.138+04	4.348+02	2.057+01	1.093+04
30	3.852+03	2.567+02	2.414+01	3.572+03
40	1.795+03	1.679+02	2.605+01	1.601+03
50	9.999+02	1.175+02	2.710+01	8.553+02
60	3.184+03	8.645+01	2.765+01	3.070+03
80	1.495+03	5.149+01	2.788+01	1.416+03
100	8.262+02	3.431+01	2.761+01	7.643+02
150	2.870+02	1.601+01	2.639+01	2.446+02
200	1.429+02	9.179+00	2.477+01	1.089+02
300	6.180+01	4.134+00	2.199+01	3.568+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	3.893+01	2.333+00	1.991+01	1.669+01	
500	2.928+01	1.494+00	1.828+01	9.508+00	
600	2.413+01	1.035+00	1.696+01	6.134+00	
800	1.873+01	5.800-01	1.493+01	3.217+00	
1000	1.587+01	3.690-01	1.346+01	2.041+00	
1500	1.238+01	1.660-01	1.096+01	9.633-01	2.858-01
2000	1.096+01	9.395-02	9.362+00	5.655-01	9.366-01
3000	1.001+01	4.202-02	7.369+00	3.011-01	2.299+00
4000	9.855+00	2.371-02	6.153+00	2.006-01	3.478+00
5000	9.974+00	1.520-02	5.310+00	1.464-01	4.502+00
6000	1.004+01	1.057-02	4.692+00	1.161-01	5.225+00
8000	1.053+01	5.956-03	3.838+00	8.049-02	6.611+00
10000	1.127+01	3.815-03	3.268+00	6.059-02	7.939+00
15000	1.253+01	1.698-03	2.417+00	3.919-02	1.008+01
20000	1.390+01	9.555-04	1.939+00	2.876-02	1.193+01
30000	1.575+01	4.251-04	1.410+00	1.860-02	1.432+01
40000	1.697+01	2.394-04	1.120+00	1.365-02	1.584+01
50000	1.807+01	1.529-04	9.338-01	1.074-02	1.713+01
60000	1.872+01	1.055-04	8.041-01	8.830-03	1.791+01
80000	1.987+01	5.848-05	6.335-01	6.481-03	1.923+01
100000	2.084+01	3.678-05	5.256-01	5.099-03	2.031+01

TABLE III. CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 65 TERBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	8.214+05	2.680+03	1.390+00	8.187+05	
1.5	1.569+06	2.558+03	2.330+00	1.566+06	
2	1.219+06	2.428+03	3.246+00	1.216+06	
3	4.191+05	2.169+03	5.032+00	4.169+05	
4	1.970+05	1.923+03	6.703+00	1.951+05	
5	1.099+05	1.701+03	8.229+00	1.082+05	
6	6.839+04	1.509+03	9.604+00	6.687+04	
8	8.609+04	1.207+03	1.197+01	8.487+04	
10	7.765+04	9.835+02	1.390+01	7.665+04	
15	2.639+04	6.364+02	1.789+01	2.574+04	
20	1.223+04	4.535+02	2.079+01	1.176+04	
30	4.137+03	2.680+02	2.442+01	3.845+03	
40	1.926+03	1.758+02	2.637+01	1.723+03	
50	1.071+03	1.234+02	2.744+01	9.199+02	
60	3.247+03	9.097+01	2.801+01	3.128+03	
80	1.528+03	5.416+01	2.826+01	1.446+03	
100	8.480+02	3.613+01	2.800+01	7.839+02	
150	2.980+02	1.689+01	2.678+01	2.543+02	
200	1.495+02	9.689+00	2.514+01	1.146+02	
300	6.485+01	4.367+00	2.233+01	3.815+01	
400	4.069+01	2.465+00	2.022+01	1.801+01	
500	3.044+01	1.578+00	1.856+01	1.030+01	
600	2.497+01	1.094+00	1.722+01	6.653+00	
800	1.925+01	6.130-01	1.516+01	3.478+00	
1000	1.625+01	3.900-01	1.367+01	2.189+00	
1500	1.264+01	1.755-01	1.113+01	1.033+00	2.978-01
2000	1.119+01	9.930-02	9.509+00	6.060-01	9.717-01
3000	1.023+01	4.441-02	7.485+00	3.222-01	2.377+00
4000	1.008+01	2.506-02	6.249+00	2.145-01	3.590+00
5000	1.021+01	1.607-02	5.393+00	1.565-01	4.642+00
6000	1.028+01	1.117-02	4.766+00	1.240-01	5.384+00
8000	1.080+01	6.295-03	3.898+00	8.596-02	6.806+00
10000	1.155+01	4.033-03	3.319+00	6.468-02	8.167+00
15000	1.286+01	1.795-03	2.455+00	4.183-02	1.036+01
20000	1.427+01	1.010-03	1.970+00	3.070-02	1.227+01
30000	1.618+01	4.494-04	1.432+00	1.986-02	1.473+01
40000	1.744+01	2.531-04	1.137+00	1.457-02	1.629+01
50000	1.857+01	1.616-04	9.486-01	1.146-02	1.761+01
60000	1.924+01	1.115-04	8.167-01	9.424-03	1.842+01
80000	2.042+01	6.184-05	6.435-01	6.917-03	1.977+01
100000	2.143+01	3.890-05	5.339-01	5.442-03	2.089+01

Z= 66 DYSPROSIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	8.736+05	2.767+03	1.376+00	8.708+05	
1.5	1.789+06	2.645+03	2.311+00	1.787+06	
2	1.225+06	2.513+03	3.223+00	1.222+06	
3	4.482+05	2.250+03	5.011+00	4.460+05	
4	2.099+05	1.998+03	6.686+00	2.079+05	
5	1.168+05	1.770+03	8.220+00	1.150+05	
6	7.249+04	1.572+03	9.605+00	7.091+04	
8	9.207+04	1.258+03	1.199+01	9.080+04	
10	8.257+04	1.025+03	1.403+01	8.153+04	
15	2.758+04	6.627+02	1.808+01	2.720+04	
20	1.290+04	4.715+02	2.102+01	1.240+04	
30	4.369+03	2.790+02	2.469+01	4.065+03	
40	2.041+03	1.837+02	2.669+01	1.831+03	
50	1.139+03	1.292+02	2.778+01	9.823+02	
60	3.424+03	9.547+01	2.836+01	3.300+03	
80	1.613+03	5.683+01	2.864+01	1.527+03	
100	8.959+02	3.795+01	2.838+01	8.295+02	
150	3.148+02	1.777+01	2.716+01	2.699+02	
200	1.576+02	1.020+01	2.551+01	1.219+02	
300	6.795+01	4.600+00	2.267+01	4.068+01	
400	4.235+01	2.597+00	2.052+01	1.923+01	
500	3.152+01	1.663+00	1.884+01	1.102+01	
600	2.575+01	1.152+00	1.748+01	7.120+00	
800	1.977+01	6.460-01	1.540+01	3.725+00	
1000	1.664+01	4.110-01	1.388+01	2.345+00	
1500	1.291+01	1.849-01	1.131+01	1.106+00	3.100-01
2000	1.142+01	1.047-01	9.656+00	6.487-01	1.008+00
3000	1.045+01	4.681-02	7.601+00	3.444-01	2.456+00
4000	1.031+01	2.641-02	6.346+00	2.291-01	3.704+00
5000	1.045+01	1.694-02	5.477+00	1.670-01	4.784+00
6000	1.053+01	1.178-02	4.840+00	1.323-01	5.545+00
8000	1.106+01	6.636-03	3.959+00	9.168-02	7.003+00
10000	1.184+01	4.251-03	3.371+00	6.596-02	8.397+00
15000	1.319+01	1.892-03	2.493+00	4.459-02	1.065+01
20000	1.464+01	1.065-03	2.000+00	3.273-02	1.261+01
30000	1.662+01	4.737-04	1.455+00	2.117-02	1.514+01
40000	1.791+01	2.668-04	1.155+00	1.554-02	1.674+01
50000	1.908+01	1.704-04	9.632-01	1.222-02	1.810+01
60000	1.977+01	1.176-04	8.294-01	1.005-02	1.893+01
80000	2.098+01	6.520-05	6.534-01	7.374-03	2.032+01
100000	2.202+01	4.102-05	5.422-01	5.801-03	2.147+01

Z= 67 HOLMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	9.338+05	2.856+03	1.362+00	9.310+05	
1.5	1.928+06	2.733+03	2.293+00	1.925+06	
2	1.318+06	2.600+03	3.203+00	1.315+06	
3	4.772+05	2.333+03	4.990+00	4.749+05	
4	2.218+05	2.075+03	6.671+00	2.197+05	
5	1.227+05	1.841+03	8.212+00	1.208+05	
6	7.580+04	1.636+03	9.608+00	7.415+04	
8	3.563+04	1.311+03	1.202+01	3.431+04	
10	8.854+04	1.069+03	1.417+01	8.746+04	
15	2.963+04	6.900+02	1.827+01	2.892+04	
20	1.370+04	4.902+02	2.125+01	1.319+04	
30	4.673+03	2.903+02	2.497+01	4.358+03	
40	2.205+03	1.917+02	2.701+01	1.986+03	
50	1.243+03	1.352+02	2.812+01	1.080+03	
60	3.674+03	1.001+02	2.872+01	3.545+03	
80	1.752+03	5.957+01	2.901+01	1.664+03	
100	9.754+02	3.981+01	2.877+01	9.068+02	
150	3.400+02	1.667+01	2.755+01	2.938+02	
200	1.682+02	1.072+01	2.588+01	1.316+02	
300	7.120+01	4.839+00	2.301+01	4.335+01	
400	4.392+01	2.732+00	2.083+01	2.036+01	
500	3.251+01	1.750+00	1.912+01	1.164+01	
600	2.650+01	1.212+00	1.775+01	7.534+00	
800	2.029+01	6.800-01	1.563+01	3.961+00	
1000	1.707+01	4.330-01	1.409+01	2.546+00	
1500	1.320+01	1.948-01	1.148+01	1.200+00	3.226-01
2000	1.166+01	1.103-01	9.803+00	7.038-01	1.044+00
3000	1.068+01	4.932-02	7.717+00	3.731-01	2.537+00
4000	1.054+01	2.783-02	6.443+00	2.480-01	3.819+00
5000	1.069+01	1.785-02	5.560+00	1.807-01	4.928+00
6000	1.078+01	1.241-02	4.913+00	1.431-01	5.708+00
8000	1.133+01	6.992-03	4.019+00	9.910-02	7.202+00
10000	1.213+01	4.479-03	3.422+00	7.451-02	8.630+00
15000	1.352+01	1.994-03	2.531+00	4.818-02	1.094+01
20000	1.502+01	1.122-03	2.031+00	3.536-02	1.295+01
30000	1.705+01	4.991-04	1.477+00	2.287-02	1.555+01
40000	1.839+01	2.811-04	1.172+00	1.678-02	1.720+01
50000	1.959+01	1.796-04	9.779-01	1.320-02	1.859+01
60000	2.030+01	1.239-04	8.420-01	1.085-02	1.945+01
80000	2.155+01	6.871-05	6.634-01	7.966-03	2.067+01
100000	2.261+01	4.324-05	5.504-01	6.266-03	2.205+01

Z= 68 ERBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.021+06	2.945+03	1.348+00	1.018+06	
1.5	2.023+06	2.822+03	2.277+00	2.020+06	
2	1.252+06	2.688+03	3.184+00	1.250+06	
3	5.050+05	2.417+03	4.972+00	5.025+05	
4	2.349+05	2.154+03	6.656+00	2.327+05	
5	1.300+05	1.914+03	8.206+00	1.281+05	
6	8.036+04	1.703+03	9.613+00	7.864+04	
8	3.780+04	1.365+03	1.205+01	3.642+04	
10	9.588+04	1.113+03	1.431+01	9.475+04	
15	3.167+04	7.184+02	1.845+01	3.093+04	
20	1.450+04	5.095+02	2.148+01	1.397+04	
30	4.879+03	3.019+02	2.525+01	4.552+03	
40	2.281+03	1.999+02	2.732+01	2.054+03	
50	1.277+03	1.414+02	2.846+01	1.107+03	
60	3.831+03	1.048+02	2.908+01	3.697+03	
80	1.804+03	6.236+01	2.939+01	1.712+03	
100	1.002+03	4.171+01	2.915+01	9.310+02	
150	3.517+02	1.958+01	2.794+01	3.042+02	
200	1.754+02	1.126+01	2.625+01	1.379+02	
300	7.468+01	5.082+00	2.334+01	4.626+01	
400	4.595+01	2.870+00	2.114+01	2.194+01	
500	3.383+01	1.839+00	1.940+01	1.259+01	
600	2.743+01	1.274+00	1.801+01	8.143+00	
800	2.084+01	7.150-01	1.567+01	4.260+00	
1000	1.743+01	4.540-01	1.430+01	2.678+00	
1500	1.345+01	2.043-01	1.165+01	1.262+00	3.355-01
2000	1.189+01	1.156-01	9.949+00	7.398-01	1.082+00
3000	1.090+01	5.172-02	7.832+00	3.915-01	2.620+00
4000	1.077+01	2.918-02	6.540+00	2.601-01	3.937+00
5000	1.092+01	1.872-02	5.643+00	1.894-01	5.074+00
6000	1.102+01	1.301-02	4.987+00	1.500-01	5.874+00
8000	1.159+01	7.332-03	4.079+00	1.038-01	7.404+00
10000	1.242+01	4.697-03	3.474+00	7.800-02	8.865+00
15000	1.386+01	2.091-03	2.569+00	5.044-02	1.124+01
20000	1.540+01	1.176-03	2.061+00	3.701-02	1.330+01
30000	1.749+01	5.234-04	1.499+00	2.393-02	1.597+01
40000	1.887+01	2.948-04	1.190+00	1.757-02	1.766+01
50000	2.010+01	1.883-04	9.926-01	1.382-02	1.909+01
60000	2.084+01	1.300-04	8.546-01	1.136-02	1.997+01
80000	2.212+01	7.207-05	6.734-01	8.336-03	2.143+01
100000	2.321+01	4.537-05	5.587-01	6.556-03	2.265+01

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 69 THULIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.082+06	3.037+03	1.334+00	1.079+06
1.5	1.490+06	2.913+03	2.262+00	1.487+06
2	1.327+06	2.777+03	3.168+00	1.324+06
3	5.343+05	2.502+03	4.954+00	5.317+05
4	2.483+05	2.235+03	6.643+00	2.460+05
5	1.373+05	1.988+03	8.201+00	1.353+05
6	8.482+04	1.771+03	9.620+00	8.304+04
8	3.986+04	1.421+03	1.209+01	3.842+04
10	8.363+04	1.159+03	1.446+01	8.246+04
15	3.309+04	7.477+02	1.864+01	3.232+04
20	1.542+04	5.295+02	2.171+01	1.487+04
30	5.271+03	3.138+02	2.552+01	4.931+03
40	2.475+03	2.083+02	2.764+01	2.239+03
50	1.385+03	1.476+02	2.880+01	1.209+03
60	4.039+03	1.097+02	2.943+01	3.900+03
80	1.896+03	6.522+01	2.976+01	1.801+03
100	1.052+03	4.365+01	2.953+01	9.787+02
150	3.690+02	2.052+01	2.832+01	3.201+02
200	1.838+02	1.180+01	2.662+01	1.454+02
300	7.800+01	5.331+00	2.368+01	4.899+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	4.776+01	3.011+00	2.144+01	2.330+01	
500	3.502+01	1.929+00	1.969+01	1.340+01	
600	2.829+01	1.336+00	1.827+01	8.683+00	
800	2.140+01	7.500-01	1.610+01	4.551+00	
1000	1.784+01	4.770-01	1.450+01	2.862+00	
1500	1.372+01	2.146-01	1.181+01	1.348+00	3.487-01
2000	1.212+01	1.215-01	1.009+01	7.900-01	1.120+00
3000	1.112+01	5.434-02	7.943+00	4.175-01	2.704+00
4000	1.100+01	3.067-02	6.632+00	2.772-01	4.056+00
5000	1.117+01	1.967-02	5.723+00	2.017-01	5.222+00
6000	1.127+01	1.367-02	5.058+00	1.597-01	6.042+00
8000	1.186+01	7.704-03	4.137+00	1.104-01	7.608+00
10000	1.271+01	4.936-03	3.523+00	8.295-02	9.103+00
15000	1.420+01	2.197-03	2.606+00	5.363-02	1.154+01
20000	1.578+01	1.236-03	2.090+00	3.936-02	1.365+01
30000	1.794+01	5.500-04	1.520+00	2.545-02	1.639+01
40000	1.935+01	3.098-04	1.207+00	1.868-02	1.813+01
50000	2.062+01	1.979-04	1.007+00	1.469-02	1.960+01
60000	2.137+01	1.366-04	8.667-01	1.208-02	2.050+01
80000	2.269+01	7.576-05	6.829-01	8.864-03	2.200+01
100000	2.382+01	4.769-05	5.666-01	6.973-03	2.324+01

Z= 70 YTTERBIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.103+06	3.129+03	1.321+00	1.100+06
1.5	4.182+05	3.005+03	2.248+00	4.152+05
2	1.388+06	2.868+03	3.153+00	1.385+06
3	5.640+05	2.589+03	4.938+00	5.614+05
4	2.622+05	2.317+03	6.632+00	2.599+05
5	1.451+05	2.064+03	8.197+00	1.430+05
6	8.963+04	1.840+03	9.628+00	8.778+04
8	4.213+04	1.478+03	1.212+01	4.064+04
10	8.348+04	1.207+03	1.425+01	8.226+04
15	3.414+04	7.782+02	1.846+01	3.335+04
20	1.616+04	5.502+02	2.163+01	1.559+04
30	5.580+03	3.261+02	2.568+01	5.228+03
40	2.618+03	2.168+02	2.789+01	2.373+03
50	1.459+03	1.540+02	2.910+01	1.276+03
60	9.082+02	1.146+02	2.976+01	7.638+02
80	2.014+03	6.811+01	3.012+01	1.916+03
100	1.146+03	4.561+01	2.990+01	1.070+03
150	4.085+02	2.147+01	2.871+01	3.584+02
200	2.023+02	1.235+01	2.699+01	1.630+02
300	8.381+01	5.582+00	2.402+01	5.420+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	5.032+01	3.153+00	2.175+01	2.542+01	
500	3.644+01	2.020+00	1.997+01	1.446+01	
600	2.922+01	1.399+00	1.853+01	9.292+00	
800	2.195+01	7.850-01	1.634+01	4.830+00	
1000	1.825+01	5.000-01	1.471+01	3.036+00	
1500	1.400+01	2.250-01	1.199+01	1.429+00	3.623-01
2000	1.236+01	1.274-01	1.024+01	8.374-01	1.160+00
3000	1.135+01	5.697-02	8.059+00	4.419-01	2.789+00
4000	1.123+01	3.215-02	6.729+00	2.931-01	4.178+00
5000	1.141+01	2.062-02	5.807+00	2.132-01	5.372+00
6000	1.153+01	1.434-02	5.131+00	1.687-01	6.212+00
8000	1.214+01	8.077-03	4.197+00	1.166-01	7.815+00
10000	1.301+01	5.175-03	3.574+00	8.756-02	9.343+00
15000	1.454+01	2.303-03	2.644+00	5.661-02	1.184+01
20000	1.617+01	1.296-03	2.121+00	4.155-02	1.400+01
30000	1.839+01	5.766-04	1.542+00	2.686-02	1.682+01
40000	1.984+01	3.248-04	1.225+00	1.971-02	1.860+01
50000	2.114+01	2.075-04	1.021+00	1.551-02	2.011+01
60000	2.192+01	1.433-04	8.794-01	1.275-02	2.103+01
80000	2.328+01	7.944-05	6.928-01	9.355-03	2.257+01
100000	2.443+01	5.002-05	5.748-01	7.359-03	2.385+01

Z= 71 LUTETIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.184+06	3.220+03	1.320+00	1.180+06
1.5	4.476+05	3.090+03	2.262+00	4.445+05
2	1.099+06	2.947+03	3.172+00	1.096+06
3	5.964+05	2.658+03	4.953+00	5.938+05
4	2.777+05	2.381+03	6.646+00	2.753+05
5	1.538+05	2.126+03	8.222+00	1.517+05
6	9.512+04	1.898+03	9.671+00	9.321+04
8	4.476+04	1.528+03	1.221+01	4.322+04
10	6.404+04	1.250+03	1.467+01	6.278+04
15	3.631+04	8.070+02	1.900+01	3.549+04
20	1.713+04	5.701+02	2.212+01	1.653+04
30	5.921+03	3.379+02	2.602+01	5.557+03
40	2.792+03	2.250+02	2.824+01	2.538+03
50	1.564+03	1.600+02	2.946+01	1.375+03
60	9.790+02	1.192+02	3.013+01	8.297+02
80	2.097+03	7.086+01	3.050+01	1.995+03
100	1.166+03	4.746+01	3.029+01	1.088+03
150	4.098+02	2.236+01	2.909+01	3.583+02
200	2.037+02	1.287+01	2.736+01	1.635+02
300	8.552+01	5.818+00	2.436+01	5.534+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	5.174+01	3.286+00	2.205+01	2.640+01	
500	3.756+01	2.106+00	2.025+01	1.521+01	
600	3.011+01	1.458+00	1.879+01	9.863+00	
800	2.256+01	8.190-01	1.657+01	5.173+00	
1000	1.869+01	5.210-01	1.492+01	3.253+00	
1500	1.430+01	2.345-01	1.216+01	1.531+00	3.762-01
2000	1.261+01	1.327-01	1.038+01	8.966-01	1.200+00
3000	1.158+01	5.937-02	8.174+00	4.724-01	2.876+00
4000	1.147+01	3.351-02	6.825+00	3.131-01	4.301+00
5000	1.166+01	2.148-02	5.890+00	2.276-01	5.524+00
6000	1.178+01	1.494-02	5.205+00	1.800-01	6.384+00
8000	1.241+01	8.418-03	4.257+00	1.244-01	8.024+00
10000	1.331+01	5.393-03	3.625+00	9.336-02	9.585+00
15000	1.488+01	2.400-03	2.682+00	6.036-02	1.214+01
20000	1.656+01	1.351-03	2.151+00	4.429-02	1.436+01
30000	1.884+01	6.009-04	1.565+00	2.864-02	1.725+01
40000	2.034+01	3.385-04	1.242+00	2.102-02	1.907+01
50000	2.167+01	2.163-04	1.036+00	1.653-02	2.062+01
60000	2.247+01	1.493-04	8.920-01	1.359-02	2.157+01
80000	2.386+01	8.281-05	7.028-01	9.972-03	2.315+01
100000	2.505+01	5.215-05	5.831-01	7.844-03	2.446+01

Z= 72 HAFNIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT
1	1.274+06	3.313+03	1.313+00	1.270+06
1.5	4.778+05	3.180+03	2.269+00	4.746+05
2	1.149+06	3.031+03	3.184+00	1.146+06
3	6.285+05	2.731+03	4.962+00	6.257+05
4	2.930+05	2.448+03	6.657+00	2.906+05
5	1.625+05	2.188+03	8.244+00	1.603+05
6	1.005+05	1.956+03	9.713+00	9.858+04
8	4.737+04	1.579+03	1.230+01	4.578+04
10	6.296+04	1.293+03	1.476+01	6.166+04
15	3.758+04	8.363+02	1.915+01	3.673+04
20	1.808+04	5.903+02	2.230+01	1.747+04
30	6.282+03	3.499+02	2.627+01	5.906+03
40	2.927+03	2.333+02	2.853+01	2.665+03
50	1.612+03	1.662+02	2.978+01	1.416+03
60	9.908+02	1.240+02	3.047+01	8.364+02
80	2.205+03	7.366+01	3.086+01	2.101+03
100	1.237+03	4.936+01	3.067+01	1.157+03
150	4.327+02	2.327+01	2.948+01	3.799+02
200	2.126+02	1.340+01	2.773+01	1.715+02
300	8.785+01	6.058+00	2.470+01	5.710+01

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
400	5.283+01	3.422+00	2.236+01	2.705+01	
500	3.832+01	2.193+00	2.053+01	1.560+01	
600	3.077+01	1.518+00	1.906+01	1.019+01	
800	2.313+01	8.530-01	1.680+01	5.477+00	
1000	1.923+01	5.420-01	1.513+01	3.563+00	
1500	1.464+01	2.439-01	1.233+01	1.676+00	3.904-01
2000	1.289+01	1.381-01	1.053+01	9.813-01	1.241+00
3000	1.183+01	6.177-02	8.290+00	5.162-01	2.965+00
4000	1.172+01	3.486-02	6.922+00	3.419-01	4.426+00
5000	1.192+01	2.235-02	5.974+00	2.484-01	5.678+00
6000	1.205+01	1.554-02	5.279+00	1.964-01	6.558+00
8000	1.270+01	8.758-03	4.318+00	1.356-01	8.235+00
10000	1.361+01	5.611-03	3.677+00	1.017-01	9.830+00
15000	1.524+01	2.497-03	2.720+00	6.578-02	1.245+01
20000	1.695+01	1.405-03	2.182+00	4.827-02	1.472+01
30000	1.930+01	6.252-04	1.587+00	3.121-02	1.768+01
40000	2.084+01	3.522-04	1.260+00	2.290-02	1.955+01
50000	2.221+01	2.251-04	1.051+00	1.801-02	2.114+01
60000	2.303+01	1.554-04	9.047-01	1.481-02	2.211+01
80000	2.445+01	8.619-05	7.128-01	1.086-02	2.373+01
100000	2.567+01	5.428-05	5.914-01	8.547-03	2.507+01

TABLE III. CONT.

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 73 TANTALUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.375+06	3.409+03	1.299+00	1.371+06	
1.5	5.065+05	3.273+03	2.267+00	5.033+05	
2	1.185+06	3.119+03	3.189+00	1.182+06	
3	6.497+05	2.807+03	4.966+00	6.469+05	
4	3.033+05	2.516+03	6.664+00	3.008+05	
5	1.684+05	2.250+03	8.263+00	1.661+05	
6	1.043+05	2.014+03	9.752+00	1.022+05	
8	4.919+04	1.629+03	1.238+01	4.754+04	
10	6.970+04	1.336+03	1.486+01	6.835+04	
15	3.986+04	8.661+02	1.930+01	3.897+04	
20	1.887+04	6.110+02	2.248+01	1.823+04	
30	6.537+03	3.621+02	2.651+01	6.148+03	
40	3.080+03	2.417+02	2.882+01	2.809+03	
50	1.723+03	1.724+02	3.011+01	1.520+03	
60	1.076+03	1.288+02	3.081+01	9.164+02	
80	2.248+03	7.647+01	3.123+01	2.140+03	
100	1.271+03	5.126+01	3.104+01	1.189+03	
150	4.511+02	2.418+01	2.986+01	3.970+02	
200	2.231+02	1.393+01	2.809+01	1.811+02	
300	9.213+01	6.298+00	2.503+01	6.080+01	
400	5.502+01	3.558+00	2.266+01	2.881+01	
500	3.962+01	2.280+00	2.081+01	1.653+01	
600	3.161+01	1.579+00	1.932+01	1.071+01	
800	2.357+01	8.860-01	1.704+01	5.644+00	
1000	1.949+01	5.640-01	1.534+01	3.586+00	
1500	1.484+01	2.539-01	1.250+01	1.686+00	4.050-01
2000	1.309+01	1.437-01	1.068+01	9.869-01	1.282+00
3000	1.204+01	6.429-02	8.406+00	5.184-01	3.055+00
4000	1.195+01	3.628-02	7.019+00	3.431-01	4.553+00
5000	1.216+01	2.326-02	6.057+00	2.491-01	5.835+00
6000	1.230+01	1.618-02	5.353+00	1.969-01	6.734+00
8000	1.297+01	9.115-03	4.378+00	1.359-01	8.448+00
10000	1.391+01	5.840-03	3.728+00	1.019-01	1.008+01
15000	1.558+01	2.599-03	2.758+00	6.586-02	1.276+01
20000	1.734+01	1.463-03	2.212+00	4.833-02	1.508+01
30000	1.976+01	6.507-04	1.609+00	3.125-02	1.812+01
40000	2.134+01	3.665-04	1.277+00	2.293-02	2.004+01
50000	2.274+01	2.343-04	1.065+00	1.804-02	2.166+01
60000	2.359+01	1.618-04	9.174-01	1.482-02	2.265+01
80000	2.505+01	8.973-05	7.228-01	1.088-02	2.432+01
100000	2.630+01	5.652-05	5.997-01	8.556-03	2.569+01

Z= 74 TUNGSTEN

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.406+06	3.507+03	1.281+00	1.402+06	
1.5	5.495+05	3.369+03	2.258+00	5.461+05	
2	1.173+06	3.210+03	3.187+00	1.169+06	
3	6.613+05	2.887+03	4.966+00	6.584+05	
4	3.136+05	2.586+03	6.668+00	3.110+05	
5	1.762+05	2.314+03	8.279+00	1.738+05	
6	1.102+05	2.073+03	9.789+00	1.081+05	
8	5.275+04	1.679+03	1.247+01	5.106+04	
10	2.994+04	1.360+03	1.494+01	2.854+04	
15	4.342+04	8.964+02	1.943+01	4.250+04	
20	2.046+04	6.322+02	2.265+01	1.981+04	
30	7.019+03	3.745+02	2.675+01	6.618+03	
40	3.276+03	2.502+02	2.911+01	2.996+03	
50	1.816+03	1.787+02	3.043+01	1.607+03	
60	1.126+03	1.335+02	3.115+01	9.609+02	
80	2.378+03	7.928+01	3.159+01	2.267+03	
100	1.353+03	5.315+01	3.141+01	1.269+03	
150	4.818+02	2.508+01	3.024+01	4.265+02	
200	2.374+02	1.445+01	2.846+01	1.944+02	
300	9.682+01	6.536+00	2.537+01	6.492+01	
400	5.719+01	3.692+00	2.297+01	3.053+01	
500	4.085+01	2.366+00	2.109+01	1.740+01	
600	3.242+01	1.638+00	1.958+01	1.120+01	
800	2.403+01	9.200-01	1.727+01	5.838+00	
1000	1.981+01	5.850-01	1.555+01	3.678+00	
1500	1.508+01	2.633-01	1.267+01	1.728+00	4.200-01
2000	1.331+01	1.491-01	1.082+01	1.011+00	1.325+00
3000	1.226+01	6.669-02	8.522+00	5.305-01	3.146+00
4000	1.219+01	3.763-02	7.116+00	3.508-01	4.681+00
5000	1.241+01	2.413-02	6.141+00	2.545-01	5.993+00
6000	1.256+01	1.678-02	5.427+00	2.011-01	6.913+00
8000	1.325+01	9.456-03	4.439+00	1.387-01	8.664+00
10000	1.422+01	6.058-03	3.780+00	1.040-01	1.033+01
15000	1.593+01	2.696-03	2.796+00	6.721-02	1.307+01
20000	1.774+01	1.517-03	2.243+00	4.932-02	1.545+01
30000	2.023+01	6.751-04	1.631+00	3.188-02	1.856+01
40000	2.184+01	3.802-04	1.295+00	2.340-02	2.052+01
50000	2.329+01	2.431-04	1.080+00	1.840-02	2.219+01
60000	2.415+01	1.679-04	9.300-01	1.512-02	2.321+01
80000	2.565+01	9.310-05	7.327-01	1.110-02	2.491+01
100000	2.694+01	5.866-05	6.079-01	8.729-03	2.632+01

Z= 75 RHENIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.531+06	3.605+03	1.257+00	1.528+06	
1.5	5.918+05	3.465+03	2.242+00	5.883+05	
2	1.274+06	3.303+03	3.178+00	1.270+06	
3	7.130+05	2.969+03	4.961+00	7.100+05	
4	3.364+05	2.658+03	6.668+00	3.337+05	
5	1.882+05	2.378+03	8.293+00	1.858+05	
6	1.173+05	2.131+03	9.824+00	1.151+05	
8	5.586+04	1.729+03	1.256+01	5.411+04	
10	3.157+04	1.424+03	1.484+01	3.013+04	
15	4.556+04	9.273+02	1.924+01	4.461+04	
20	2.126+04	6.537+02	2.253+01	2.059+04	
30	7.310+03	3.871+02	2.688+01	6.896+03	
40	3.453+03	2.588+02	2.933+01	3.165+03	
50	1.943+03	1.848+02	3.071+01	1.727+03	
60	1.222+03	1.382+02	3.147+01	1.052+03	
80	2.497+03	8.203+01	3.193+01	2.383+03	
100	1.446+03	5.499+01	3.177+01	1.359+03	
150	5.185+02	2.596+01	3.062+01	4.619+02	
200	2.537+02	1.496+01	2.883+01	2.099+02	
300	1.020+02	6.765+00	2.569+01	6.951+01	
400	5.977+01	3.822+00	2.327+01	3.268+01	
500	4.257+01	2.450+00	2.137+01	1.875+01	
600	3.376+01	1.696+00	1.984+01	1.222+01	
800	2.505+01	9.530-01	1.749+01	6.597+00	
1000	2.071+01	6.050-01	1.576+01	4.343+00	
1500	1.559+01	2.723-01	1.284+01	2.042+00	4.357-01
2000	1.369+01	1.542-01	1.097+01	1.195+00	1.369+00
3000	1.257+01	6.897-02	8.638+00	6.258-01	3.240+00
4000	1.248+01	3.893-02	7.213+00	4.135-01	4.812+00
5000	1.270+01	2.496-02	6.224+00	2.998-01	6.149+00
6000	1.285+01	1.736-02	5.501+00	2.370-01	7.090+00
8000	1.355+01	9.781-03	4.499+00	1.635-01	8.880+00
10000	1.454+01	6.266-03	3.831+00	1.226-01	1.058+01
15000	1.630+01	2.789-03	2.834+00	7.512-02	1.338+01
20000	1.815+01	1.570-03	2.273+00	5.800-02	1.582+01
30000	2.070+01	6.982-04	1.653+00	3.744-02	1.901+01
40000	2.236+01	3.933-04	1.313+00	2.745-02	2.102+01
50000	2.383+01	2.514-04	1.095+00	2.158-02	2.272+01
60000	2.472+01	1.737-04	9.427-01	1.772-02	2.376+01
80000	2.626+01	9.633-05	7.427-01	1.299-02	2.551+01
100000	2.758+01	6.070-05	6.162-01	1.021-02	2.695+01

Z= 76 OSMIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.594+06	3.706+03	1.169+00	1.590+06	
1.5	6.501+05	3.564+03	2.133+00	6.466+05	
2	9.596+05	3.398+03	3.081+00	9.562+05	
3	7.005+05	3.054+03	4.884+00	6.975+05	
4	3.561+05	2.732+03	6.614+00	3.533+05	
5	1.988+05	2.444+03	8.242+00	1.964+05	
6	1.238+05	2.191+03	9.813+00	1.216+05	
8	5.880+04	1.780+03	1.260+01	5.701+04	
10	3.317+04	1.468+03	1.517+01	3.169+04	
15	4.678+04	9.586+02	1.978+01	4.580+04	
20	2.225+04	6.757+02	2.305+01	2.155+04	
30	7.750+03	3.999+02	2.724+01	7.323+03	
40	3.663+03	2.673+02	2.969+01	3.366+03	
50	2.051+03	1.909+02	3.107+01	1.829+03	
60	1.281+03	1.428+02	3.184+01	1.107+03	
80	2.657+03	8.474+01	3.231+01	2.540+03	
100	1.480+03	5.681+01	3.216+01	1.391+03	
150	5.208+02	2.681+01	3.100+01	4.630+02	
200	2.579+02	1.545+01	2.919+01	2.133+02	
300	1.063+02	6.988+00	2.605+01	7.327+01	
400	6.282+01	3.948+00	2.358+01	3.530+01	
500	4.464+01	2.530+00	2.165+01	2.046+01	
600	3.518+01	1.752+00	2.010+01	1.333+01	
800	2.574+01	9.840-01	1.774+01	7.020+00	
1000	2.101+01	6.260-01	1.597+01	4.418+00	
1500	1.583+01	2.818-01	1.301+01	2.078+00	4.517-01
2000	1.391+01	1.595-01	1.117+01	1.217+00	1.414+00
3000	1.280+01	7.138-02	8.753+00	6.360-01	3.336+00
4000	1.272+01	4.028-02	7.309+00	4.199-01	4.945+00
5000	1.294+01	2.583-02	6.308+00	3.043-01	6.306+00
6000	1.310+01	1.796-02	5.574+00	2.405-01	7.268+00
8000	1.383+01	1.012-02	4.559+00	1.660-01	9.097+00
10000	1.485+01	6.485-03	3.883+00	1.245-01	1.083+01
15000	1.666+01	2.886-03	2.872+00	8.023-02	1.370+01
20000	1.855+01	1.624-03	2.304+00	5.877-02	1.619+01
30000	2.117+01	7.226-04	1.676+00	3.789-02	1.946+01
40000	2.287+01	4.070-04	1.330+00	2.779-02	2.151+01
50000	2.438+01	2.602-04	1.110+00	2.180-02	2.325+01
60000	2.529+01	1.797-04	9.553-01	1.789-02	2.432+01
80000	2.688+01	9.971-05	7.527-01	1.311-02	2.611+01
100000	2.823+01	6.284-05	6.245-01	1.029-02	2.759+01

TABLE III, CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 77 IRIDIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.697+06	3.807+03	1.110+00	1.693+06	
1.5	6.431+05	3.664+03	2.058+00	6.394+05	
2	3.239+05	3.496+03	3.013+00	3.204+05	
3	7.532+05	3.141+03	4.832+00	7.501+05	
4	3.810+05	2.809+03	6.579+00	3.781+05	
5	2.119+05	2.512+03	8.214+00	2.094+05	
6	1.315+05	2.252+03	9.813+00	1.292+05	
8	6.216+04	1.832+03	1.265+01	6.032+04	
10	3.493+04	1.513+03	1.524+01	3.340+04	
15	4.814+04	9.905+02	1.988+01	4.713+04	
20	2.345+04	6.983+02	2.318+01	2.273+04	
30	8.271+03	4.128+02	2.746+01	7.831+03	
40	3.885+03	2.758+02	2.996+01	3.579+03	
50	2.148+03	1.970+02	3.138+01	1.920+03	
60	1.322+03	1.472+02	3.217+01	1.143+03	
80	2.722+03	8.737+01	3.267+01	2.601+03	
100	1.531+03	5.856+01	3.252+01	1.440+03	
150	5.443+02	2.763+01	3.138+01	4.853+02	
200	2.702+02	1.592+01	2.956+01	2.247+02	
300	1.111+02	7.201+00	2.638+01	7.747+01	
400	6.530+01	4.068+00	2.388+01	3.735+01	
500	4.621+01	2.607+00	2.194+01	2.166+01	
600	3.629+01	1.805+00	2.037+01	1.411+01	
800	2.642+01	1.014+00	1.797+01	7.440+00	
1000	2.152+01	6.450-01	1.618+01	4.690+00	
1500	1.615+01	2.904-01	1.319+01	2.207+00	4.681-01
2000	1.418+01	1.644-01	1.126+01	1.293+00	1.459+00
3000	1.305+01	7.355-02	8.869+00	6.745-01	3.433+00
4000	1.297+01	4.151-02	7.406+00	4.450-01	5.080+00
5000	1.321+01	2.662-02	6.391+00	3.223-01	6.465+00
6000	1.337+01	1.851-02	5.648+00	2.548-01	7.449+00
8000	1.412+01	1.043-02	4.620+00	1.758-01	9.317+00
10000	1.516+01	6.683-03	3.934+00	1.319-01	1.109+01
15000	1.702+01	2.974-03	2.910+00	8.492-02	1.402+01
20000	1.896+01	1.674-03	2.334+00	6.213-02	1.656+01
30000	2.165+01	7.446-04	1.698+00	4.001-02	1.991+01
40000	2.339+01	4.194-04	1.348+00	2.928-02	2.201+01
50000	2.493+01	2.682-04	1.124+00	2.298-02	2.379+01
60000	2.587+01	1.852-04	9.680-01	1.885-02	2.488+01
80000	2.749+01	1.028-04	7.627-01	1.380-02	2.672+01
100000	2.888+01	6.478-05	6.328-01	1.083-02	2.823+01

Z= 78 PLATINUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.760+06	3.916+03	1.072+00	1.756+06	
1.5	6.814+05	3.776+03	2.009+00	6.776+05	
2	3.484+05	3.608+03	2.967+00	3.448+05	
3	7.469+05	3.245+03	4.801+00	7.437+05	
4	4.182+05	2.899+03	6.557+00	4.153+05	
5	2.291+05	2.589+03	8.206+00	2.265+05	
6	1.404+05	2.319+03	9.820+00	1.381+05	
8	6.509+04	1.886+03	1.270+01	6.319+04	
10	3.604+04	1.559+03	1.530+01	3.447+04	
15	5.205+04	1.024+03	1.996+01	5.101+04	
20	2.470+04	7.217+02	2.331+01	2.395+04	
30	8.538+03	4.261+02	2.768+01	8.084+03	
40	4.001+03	2.844+02	3.024+01	3.687+03	
50	2.223+03	2.028+02	3.169+01	1.988+03	
60	1.378+03	1.514+02	3.250+01	1.194+03	
80	2.843+03	8.988+01	3.302+01	2.720+03	
100	1.585+03	6.022+01	3.289+01	1.492+03	
150	5.571+02	2.839+01	3.176+01	4.969+02	
200	2.751+02	1.635+01	2.993+01	2.288+02	
300	1.128+02	7.394+00	2.672+01	7.873+01	
400	6.644+01	4.177+00	2.419+01	3.807+01	
500	4.709+01	2.677+00	2.222+01	2.219+01	
600	3.703+01	1.854+00	2.063+01	1.455+01	
800	2.702+01	1.041+00	1.821+01	7.773+00	
1000	2.202+01	6.620-01	1.639+01	4.969+00	
1500	1.648+01	2.980-01	1.336+01	2.340+00	4.849-01
2000	1.446+01	1.687-01	1.141+01	1.371+00	1.506+00
3000	1.331+01	7.550-02	8.985+00	7.140-01	3.532+00
4000	1.323+01	4.261-02	7.503+00	4.707-01	5.216+00
5000	1.347+01	2.732-02	6.475+00	3.407-01	6.626+00
6000	1.364+01	1.900-02	5.722+00	2.694-01	7.631+00
8000	1.442+01	1.071-02	4.680+00	1.859-01	9.539+00
10000	1.548+01	6.860-03	3.986+00	1.395-01	1.135+01
15000	1.738+01	3.053-03	2.948+00	8.970-02	1.434+01
20000	1.937+01	1.718-03	2.365+00	6.557-02	1.694+01
30000	2.213+01	7.644-04	1.720+00	4.216-02	2.037+01
40000	2.391+01	4.306-04	1.366+00	3.083-02	2.251+01
50000	2.549+01	2.753-04	1.139+00	2.418-02	2.433+01
60000	2.645+01	1.902-04	9.807-01	1.982-02	2.545+01
80000	2.812+01	1.055-04	7.727-01	1.449-02	2.733+01
100000	2.954+01	6.652-05	6.411-01	1.137-02	2.888+01

Z= 79 GOLD

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	1.871+06	4.021+03	1.042+00	1.867+06	
1.5	7.302+05	3.880+03	1.964+00	7.263+05	
2	3.754+05	3.710+03	2.916+00	3.717+05	
3	6.916+05	3.328+03	4.768+00	6.883+05	
4	4.029+05	2.981+03	6.525+00	3.999+05	
5	2.276+05	2.662+03	8.207+00	2.250+05	
6	1.430+05	2.383+03	9.817+00	1.406+05	
8	6.891+04	1.939+03	1.276+01	6.696+04	
10	3.929+04	1.605+03	1.525+01	3.767+04	
15	5.384+04	1.057+03	1.991+01	5.277+04	
20	2.562+04	7.453+02	2.330+01	2.485+04	
30	8.906+03	4.396+02	2.784+01	8.438+03	
40	4.193+03	2.930+02	3.048+01	3.870+03	
50	2.339+03	2.087+02	3.198+01	2.098+03	
60	1.455+03	1.557+02	3.282+01	1.266+03	
80	6.912+02	9.239+01	3.337+01	5.655+02	
100	1.675+03	6.187+01	3.325+01	1.580+03	
150	6.054+02	2.915+01	3.214+01	5.441+02	
200	2.982+02	1.678+01	3.029+01	2.511+02	
300	1.198+02	7.588+00	2.703+01	8.517+01	
400	6.937+01	4.286+00	2.449+01	4.059+01	
500	4.868+01	2.747+00	2.250+01	2.343+01	
600	3.808+01	1.902+00	2.089+01	1.529+01	
800	2.768+01	1.068+00	1.842+01	8.192+00	
1000	2.258+01	6.800-01	1.659+01	5.308+00	
1500	1.683+01	3.062-01	1.352+01	2.501+00	5.021-01
2000	1.475+01	1.733-01	1.155+01	1.466+00	1.553+00
3000	1.357+01	7.756-02	9.096+00	7.620-01	3.632+00
4000	1.350+01	4.377-02	7.596+00	5.019-01	5.355+00
5000	1.374+01	2.807-02	6.555+00	3.631-01	6.789+00
6000	1.391+01	1.952-02	5.793+00	2.871-01	7.816+00
8000	1.471+01	1.100-02	4.738+00	1.983-01	9.763+00
10000	1.580+01	7.047-03	4.035+00	1.487-01	1.161+01
15000	1.775+01	3.137-03	2.985+00	9.553-02	1.467+01
20000	1.979+01	1.765-03	2.394+00	6.977-02	1.732+01
30000	2.262+01	7.853-04	1.741+00	4.481-02	2.083+01
40000	2.443+01	4.423-04	1.382+00	3.272-02	2.302+01
50000	2.605+01	2.829-04	1.153+00	2.565-02	2.487+01
60000	2.704+01	1.954-04	9.928-01	2.102-02	2.602+01
80000	2.875+01	1.084-04	7.822-01	1.535-02	2.795+01
100000	3.020+01	6.836-05	6.490-01	1.203-02	2.954+01

Z= 80 MERCURY

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.026+06	4.121+03	1.152+00	2.022+06	
1.5	7.900+05	3.975+03	2.127+00	7.860+05	
2	4.059+05	3.799+03	3.089+00	4.021+05	
3	7.534+05	3.418+03	4.927+00	7.499+05	
4	4.353+05	3.054+03	6.679+00	4.322+05	
5	2.443+05	2.729+03	8.350+00	2.416+05	
6	1.527+05	2.445+03	9.947+00	1.502+05	
8	7.296+04	1.990+03	1.289+01	7.096+04	
10	4.133+04	1.650+03	1.541+01	3.966+04	
15	5.607+04	1.089+03	2.011+01	5.496+04	
20	2.702+04	7.689+02	2.352+01	2.623+04	
30	9.509+03	4.532+02	2.809+01	9.028+03	
40	4.497+03	3.018+02	3.077+01	4.164+03	
50	2.510+03	2.148+02	3.230+01	2.263+03	
60	1.559+03	1.601+02	3.315+01	1.366+03	
80	7.378+02	9.503+01	3.373+01	6.091+02	
100	1.722+03	6.362+01	3.362+01	1.625+03	
150	5.894+02	2.996+01	3.252+01	5.269+02	
200	2.908+02	1.725+01	3.066+01	2.429+02	
300	1.203+02	7.794+00	2.736+01	8.515+01	
400	7.115+01	4.403+00	2.480+01	4.195+01	
500	5.040+01	2.822+00	2.278+01	2.480+01	
600	3.951+01	1.954+00	2.115+01	1.641+01	
800	2.859+01	1.098+00	1.865+01	8.834+00	
1000	2.313+01	6.970-01	1.680+01	5.630+00	
1500	1.718+01	3.138-01	1.369+01	2.654+00	5.197-01
2000	1.503+01	1.777-01	1.170+01	1.556+00	1.602+00
3000	1.383+01	7.951-02	9.212+00	8.074-01	3.734+00
4000	1.376+01	4.487-02	7.692+00	5.315-01	5.495+00
5000	1.400+01	2.878-02	6.638+00	3.843-01	6.954+00
6000	1.419+01	2.001-02	5.867+00	3.039-01	8.002+00
8000	1.501+01	1.128-02	4.799+00	2.099-01	9.989+00
10000	1.612+01	7.225-03	4.086+00	1.575-01	1.187+01
15000	1.812+01	3.216-03	3.023+00	1.010-01	1.500+01
20000	2.020+01	1.810-03	2.425+00	7.371-02	1.770+01
30000	2.310+01	8.050-04	1.764+00	4.728-02	2.129+01
40000	2.496+01	4.535-04	1.400+00	3.450-02	2.353+01
50000	2.662+01	2.900-04	1.168+00	2.702-02	2.542+01
60000	2.763+01	2.004-04	1.005+00	2.213-02	2.660+01
80000	2.938+01	1.112-04	7.922-01	1.615-02	2.857+01
100000	3.087+01	7.011-05	6.573-01	1.265-02	3.020+01

TABLE III, CONT. PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 81 THALLIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.083+06	4.216+03	1.170+00	2.079+06	
1.5	8.330+05	4.061+03	2.170+00	8.289+05	
2	4.356+05	3.878+03	3.168+00	4.317+05	
3	7.966+05	3.492+03	5.064+00	7.931+05	
4	4.590+05	3.124+03	6.838+00	4.559+05	
5	2.571+05	2.793+03	8.511+00	2.543+05	
6	1.604+05	2.505+03	1.010+01	1.578+05	
8	7.642+04	2.042+03	1.304+01	7.437+04	
10	4.319+04	1.694+03	1.557+01	4.148+04	
15	5.183+04	1.122+03	2.023+01	5.069+04	
20	2.845+04	7.928+02	2.368+01	2.764+04	
30	9.915+03	4.674+02	2.836+01	9.419+03	
40	4.694+03	3.116+02	3.107+01	4.351+03	
50	2.633+03	2.220+02	3.263+01	2.378+03	
60	1.647+03	1.656+02	3.350+01	1.447+03	
80	7.896+02	9.830+01	3.409+01	6.572+02	
100	1.849+03	6.583+01	3.398+01	1.749+03	
150	6.504+02	3.101+01	3.289+01	5.865+02	
200	3.213+02	1.785+01	3.102+01	2.724+02	
300	1.307+02	8.071+00	2.772+01	9.493+01	
400	7.585+01	4.559+00	2.510+01	4.619+01	
500	5.294+01	2.922+00	2.306+01	2.696+01	
600	4.108+01	2.023+00	2.141+01	1.764+01	
800	2.938+01	1.136+00	1.890+01	9.339+00	
1000	2.362+01	7.230-01	1.701+01	5.884+00	
1500	1.750+01	3.255-01	1.387+01	2.775+00	5.377-01
2000	1.531+01	1.843-01	1.185+01	1.628+00	1.651+00
3000	1.409+01	8.248-02	9.327+00	8.431-01	3.838+00
4000	1.403+01	4.655-02	7.789+00	5.546-01	5.637+00
5000	1.427+01	2.986-02	6.722+00	4.007-01	7.120+00
6000	1.447+01	2.076-02	5.940+00	3.170-01	8.190+00
8000	1.531+01	1.170-02	4.859+00	2.190-01	1.022+01
10000	1.644+01	7.495-03	4.138+00	1.643-01	1.213+01
15000	1.849+01	3.336-03	3.061+00	1.053-01	1.533+01
20000	2.062+01	1.877-03	2.455+00	7.674-02	1.809+01
30000	2.360+01	8.352-04	1.786+00	4.915-02	2.176+01
40000	2.550+01	4.704-04	1.418+00	3.583-02	2.404+01
50000	2.719+01	3.009-04	1.182+00	2.804-02	2.598+01
60000	2.822+01	2.079-04	1.018+00	2.295-02	2.718+01
80000	3.002+01	1.154-04	8.022-01	1.673-02	2.920+01
100000	3.154+01	7.276-05	6.655-01	1.309-02	3.086+01

Z= 82 LEAD

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.146+06	4.317+03	1.185+00	2.142+06	
1.5	8.633+05	4.154+03	2.210+00	8.591+05	
2	4.533+05	3.964+03	3.242+00	4.493+05	
3	6.283+05	3.567+03	5.196+00	6.248+05	
4	4.860+05	3.193+03	6.997+00	4.828+05	
5	2.722+05	2.858+03	8.675+00	2.694+05	
6	1.698+05	2.565+03	1.026+01	1.672+05	
8	8.090+04	2.093+03	1.319+01	7.879+04	
10	4.571+04	1.738+03	1.556+01	4.396+04	
15	3.871+04	1.155+03	2.016+01	3.754+04	
20	2.959+04	8.170+02	2.367+01	2.875+04	
30	1.025+04	4.812+02	2.854+01	9.745+03	
40	4.833+03	3.201+02	3.132+01	4.482+03	
50	2.701+03	2.275+02	3.292+01	2.441+03	
60	1.684+03	1.693+02	3.382+01	1.480+03	
80	8.035+02	1.005+02	3.443+01	6.686+02	
100	1.879+03	6.727+01	3.434+01	1.777+03	
150	6.852+02	3.164+01	3.327+01	6.203+02	
200	3.401+02	1.621+01	3.139+01	2.905+02	
300	1.368+02	8.226+00	2.804+01	1.005+02	
400	7.837+01	4.647+00	2.540+01	4.833+01	
500	5.425+01	2.977+00	2.334+01	2.793+01	
600	4.188+01	2.062+00	2.167+01	1.815+01	
800	2.983+01	1.158+00	1.912+01	9.549+00	
1000	2.398+01	7.360-01	1.722+01	6.028+00	
1500	1.777+01	3.314-01	1.404+01	2.844+00	5.561-01
2000	1.555+01	1.877-01	1.199+01	1.669+00	1.701+00
3000	1.433+01	8.397-02	9.444+00	8.630-01	3.944+00
4000	1.428+01	4.739-02	7.887+00	5.672-01	5.782+00
5000	1.453+01	3.040-02	6.806+00	4.096-01	7.288+00
6000	1.474+01	2.114-02	6.015+00	3.241-01	8.380+00
8000	1.560+01	1.191-02	4.919+00	2.239-01	1.045+01
10000	1.677+01	7.631-03	4.189+00	1.681-01	1.240+01
15000	1.887+01	3.396-03	3.099+00	1.075-01	1.566+01
20000	2.104+01	1.911-03	2.486+00	7.831-02	1.848+01
30000	2.409+01	8.503-04	1.805+00	5.009-02	2.223+01
40000	2.603+01	4.790-04	1.435+00	3.649-02	2.456+01
50000	2.776+01	3.064-04	1.197+00	2.853-02	2.654+01
60000	2.882+01	2.117-04	1.031+00	2.334-02	2.777+01
80000	3.066+01	1.175-04	8.122-01	1.700-02	2.983+01
100000	3.222+01	7.410-05	6.738-01	1.329-02	3.153+01

Z= 83 BISMUTH

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.386+06	4.417+03	1.193+00	2.381+06	
1.5	9.379+05	4.246+03	2.228+00	9.336+05	
2	4.845+05	4.048+03	3.297+00	4.804+05	
3	6.413+05	3.641+03	5.322+00	6.376+05	
4	5.032+05	3.261+03	7.158+00	4.999+05	
5	2.836+05	2.922+03	8.844+00	2.807+05	
6	1.778+05	2.625+03	1.043+01	1.752+05	
8	8.539+04	2.145+03	1.335+01	8.323+04	
10	4.853+04	1.782+03	1.591+01	4.673+04	
15	3.965+04	1.188+03	2.075+01	3.845+04	
20	3.086+04	8.416+02	2.421+01	2.999+04	
30	1.091+04	4.951+02	2.886+01	1.039+04	
40	5.198+03	3.284+02	3.165+01	4.838+03	
50	2.923+03	2.328+02	3.326+01	2.657+03	
60	1.828+03	1.729+02	3.417+01	1.621+03	
80	8.745+02	1.027+02	3.480+01	7.370+02	
100	2.016+03	6.865+01	3.472+01	1.912+03	
150	7.210+02	3.224+01	3.365+01	6.551+02	
200	3.548+02	1.854+01	3.175+01	3.045+02	
300	1.418+02	8.371+00	2.836+01	1.051+02	
400	8.115+01	4.728+00	2.571+01	5.071+01	
500	5.615+01	3.029+00	2.362+01	2.950+01	
600	4.335+01	2.098+00	2.194+01	1.931+01	
800	3.086+01	1.178+00	1.935+01	1.033+01	
1000	2.481+01	7.490-01	1.743+01	6.627+00	
1500	1.825+01	3.373-01	1.421+01	3.125+00	5.750-01
2000	1.592+01	1.910-01	1.214+01	1.833+00	1.753+00
3000	1.464+01	8.546-02	9.559+00	9.493-01	4.051+00
4000	1.458+01	4.824-02	7.983+00	6.236-01	5.928+00
5000	1.484+01	3.094-02	6.869+00	4.502-01	7.467+00
6000	1.504+01	2.151-02	6.088+00	3.561-01	8.577+00
8000	1.592+01	1.212-02	4.980+00	2.461-01	1.068+01
10000	1.710+01	7.767-03	4.241+00	1.847-01	1.266+01
15000	1.924+01	3.457-03	3.137+00	1.193-01	1.598+01
20000	2.146+01	1.946-03	2.516+00	8.621-02	1.886+01
30000	2.458+01	8.655-04	1.830+00	5.520-02	2.270+01
40000	2.657+01	4.875-04	1.453+00	4.023-02	2.508+01
50000	2.834+01	3.119-04	1.212+00	3.148-02	2.710+01
60000	2.942+01	2.155-04	1.044+00	2.576-02	2.836+01
80000	3.130+01	1.196-04	8.221-01	1.878-02	3.046+01
100000	3.259+01	7.545-05	6.821-01	1.469-02	3.220+01

Z= 86 RADON

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.428+06	4.740+03	1.150+00	2.423+06	
1.5	1.051+06	4.549+03	2.232+00	1.047+06	
2	5.716+05	4.329+03	3.374+00	5.672+05	
3	5.515+05	3.878+03	5.591+00	5.477+05	
4	4.845+05	3.469+03	7.607+00	4.810+05	
5	3.309+05	3.114+03	9.379+00	3.278+05	
6	2.065+05	2.805+03	1.099+01	2.037+05	
8	9.848+04	2.302+03	1.390+01	9.616+04	
10	5.565+04	1.918+03	1.648+01	5.372+04	
15	4.511+04	1.288+03	2.144+01	4.381+04	
20	3.533+04	9.173+02	2.494+01	3.438+04	
30	1.254+04	5.379+02	2.966+01	1.197+04	
40	5.967+03	3.535+02	3.253+01	5.581+03	
50	3.345+03	2.484+02	3.422+01	3.062+03	
60	2.084+03	1.832+02	3.518+01	1.865+03	
80	9.897+02	1.089+02	3.587+01	8.449+02	
100	2.254+03	7.261+01	3.582+01	2.145+03	
150	5.012+02	3.393+01	3.478+01	7.325+02	
200	3.965+02	1.946+01	3.285+01	3.441+02	
300	1.597+02	8.772+00	2.936+01	1.216+02	
400	9.119+01	4.952+00	2.662+01	5.961+01	
500	6.261+01	3.172+00	2.447+01	3.497+01	
600	4.788+01	2.199+00	2.272+01	2.296+01	
800	3.348+01	1.233+00	2.004+01	1.220+01	
1000	2.654+01	7.840-01	1.806+01	7.699+00	
1500	1.934+01	3.531-01	1.473+01	3.623+00	6.341-01
2000	1.682+01	2.000-01	1.258+01	2.122+00	1.916+00
3000	1.548+01	8.948-02	9.908+00	1.105+00	4.382+00
4000	1.543+01	5.051-02	8.275+00	7.248-01	6.378+00
5000	1.571+01	3.239-02	7.141+00	5.226-01	8.015+00
6000	1.593+01	2.253-02	6.310+00	4.134-01	9.183+00
8000	1.685+01	1.269-02	5.162+00	2.855-01	1.139+01
10000	1.808+01	8.133-03	4.396+00	2.143-01	1.346+01
15000	2.037+01	3.620-03	3.252+00	1.376-01	1.697+01
20000	2.273+01	2.037-03	2.608+00	1.005-01	2.002+01
30000	2.607+01	9.063-04	1.897+00	6.459-02	2.411+01
40000	2.821+01	5.105-04	1.506+00	4.718-02	2.666+01
50000	3.011+01	3.266-04	1.256+00	3.698-02	2.892+01
60000	3.126+01	2.258-04	1.082+00	3.031-02	3.015+01
80000	3.325+01	1.253-04	8.522-01	2.214-02	3.237+01
100000	3.494+01	7.908-05	7.070-01	1.735-02	3.422+01

TABLE III. CONT.

PHOTON CROSS SECTION COMPARISON

ENDF/B IN BARNS/ATOM

Z= 90 THORIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.549+06	5.137+03	1.035+00	2.544+06	
1.5	1.205+06	4.899+03	2.136+00	1.200+06	
2	6.969+05	4.646+03	3.316+00	6.923+05	
3	3.230+05	4.165+03	5.798+00	3.189+05	
4	4.275+05	3.734+03	8.181+00	4.238+05	
5	3.691+05	3.358+03	1.015+01	3.658+05	
6	2.496+05	3.034+03	1.184+01	2.466+05	
8	1.197+05	2.506+03	1.474+01	1.172+05	
10	6.792+04	2.097+03	1.593+01	6.581+04	
15	2.451+04	1.421+03	2.118+01	2.307+04	
20	3.741+04	1.021+03	2.479+01	3.637+04	
30	1.496+04	5.986+02	2.993+01	1.433+04	
40	7.073+03	3.907+02	3.333+01	6.649+03	
50	3.970+03	2.728+02	3.526+01	3.662+03	
60	2.485+03	2.004+02	3.634+01	2.248+03	
80	1.196+03	1.192+02	3.719+01	1.040+03	
100	6.879+02	7.931+01	3.722+01	5.714+02	
150	9.356+02	3.691+01	3.629+01	8.624+02	
200	4.630+02	2.114+01	3.432+01	4.075+02	
300	1.845+02	9.514+00	3.027+01	1.447+02	
400	1.045+02	5.369+00	2.787+01	7.128+01	
500	7.110+01	3.438+00	2.565+01	4.201+01	
600	5.392+01	2.383+00	2.381+01	2.772+01	
800	3.696+01	1.337+00	2.072+01	1.490+01	
1000	2.931+01	8.510-01	1.894+01	9.524+00	
1500	2.102+01	3.833-01	1.545+01	4.469+00	7.191-01
2000	1.817+01	2.171-01	1.320+01	2.613+00	2.146+00
3000	1.671+01	9.716-02	1.039+01	1.370+00	4.847+00
4000	1.664+01	5.485-02	8.681+00	8.970-01	7.008+00
5000	1.695+01	3.518-02	7.490+00	6.457-01	8.777+00
6000	1.718+01	2.446-02	6.621+00	5.107-01	1.002+01
8000	1.814+01	1.379-02	5.415+00	3.527-01	1.235+01
10000	1.942+01	8.832-03	4.612+00	2.646-01	1.454+01
15000	2.191+01	3.931-03	3.412+00	1.707-01	1.832+01
20000	2.445+01	2.213-03	2.737+00	1.251-01	2.159+01
30000	2.811+01	9.843-04	1.990+00	8.066-02	2.604+01
40000	3.044+01	5.544-04	1.580+00	5.910-02	2.880+01
50000	3.252+01	3.548-04	1.318+00	4.643-02	3.115+01
60000	3.376+01	2.453-04	1.135+00	3.812-02	3.259+01
80000	3.590+01	1.363-04	8.941-01	2.793-02	3.498+01
100000	3.773+01	8.600-05	7.418-01	2.194-02	3.696+01

Z= 92 URANIUM

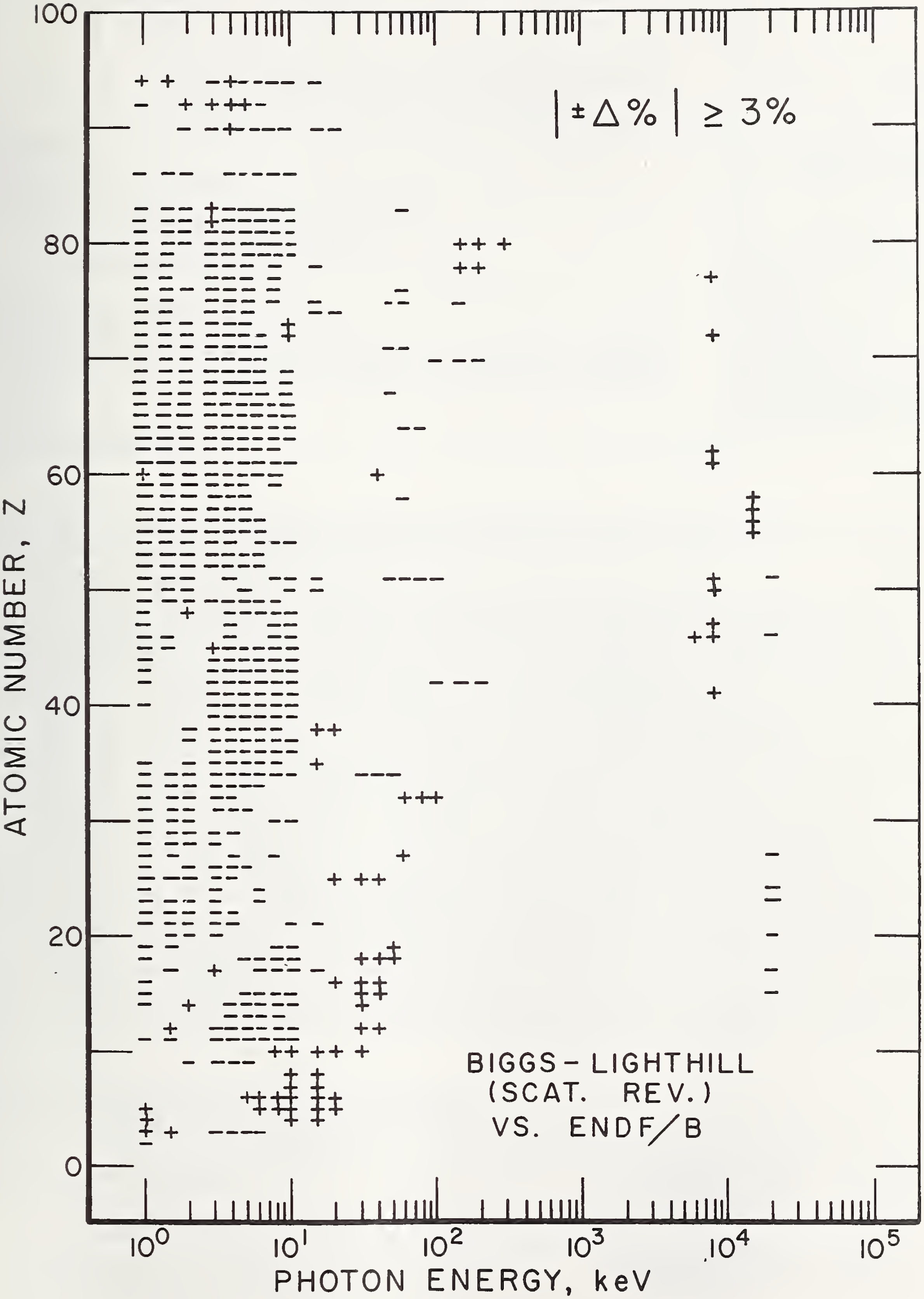
ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.904+06	5.385+03	9.549-01	2.899+06	
1.5	1.261+06	5.150+03	2.047+00	1.256+06	
2	6.871+05	4.896+03	3.220+00	6.822+05	
3	2.930+05	4.397+03	5.827+00	2.886+05	
4	4.320+05	3.939+03	8.452+00	4.281+05	
5	3.292+05	3.535+03	1.056+01	3.257+05	
6	2.540+05	3.187+03	1.233+01	2.508+05	
8	1.224+05	2.628+03	1.521+01	1.196+05	
10	6.972+04	2.199+03	1.710+01	6.750+04	
15	2.534+04	1.495+03	2.117+01	2.382+04	
20	2.736+04	1.077+03	2.483+01	2.626+04	
30	1.603+04	6.326+02	3.014+01	1.536+04	
40	7.748+03	4.124+02	3.375+01	7.302+03	
50	4.391+03	2.876+02	3.580+01	4.067+03	
60	2.756+03	2.110+02	3.693+01	2.508+03	
80	1.322+03	1.256+02	3.786+01	1.158+03	
100	7.522+02	8.355+01	3.793+01	6.307+02	
150	1.018+03	3.886+01	3.704+01	9.417+02	
200	5.018+02	2.224+01	3.506+01	4.445+02	
300	1.997+02	1.001+01	3.073+01	1.580+02	
400	1.121+02	5.647+00	2.849+01	7.799+01	
500	7.595+01	3.616+00	2.624+01	4.609+01	
600	5.736+01	2.507+00	2.435+01	3.050+01	
800	3.895+01	1.406+00	2.106+01	1.648+01	
1000	3.086+01	8.950-01	1.938+01	1.059+01	
1500	2.194+01	4.032-01	1.581+01	4.963+00	7.643-01
2000	1.890+01	2.284-01	1.351+01	2.898+00	2.269+00
3000	1.736+01	1.022-01	1.064+01	1.526+00	5.091+00
4000	1.727+01	5.770-02	8.885+00	9.977-01	7.333+00
5000	1.759+01	3.701-02	7.666+00	7.176-01	9.171+00
6000	1.782+01	2.574-02	6.776+00	5.675-01	1.045+01
8000	1.880+01	1.450-02	5.543+00	3.918-01	1.285+01
10000	2.011+01	9.292-03	4.720+00	2.940-01	1.509+01
15000	2.269+01	4.136-03	3.492+00	1.900-01	1.900+01
20000	2.533+01	2.328-03	2.801+00	1.394-01	2.238+01
30000	2.914+01	1.035-03	2.037+00	9.012-02	2.702+01
40000	3.158+01	5.832-04	1.617+00	6.612-02	2.989+01
50000	3.374+01	3.733-04	1.349+00	5.201-02	3.234+01
60000	3.503+01	2.581-04	1.162+00	4.274-02	3.382+01
80000	3.725+01	1.434-04	9.151-01	3.136-02	3.631+01
100000	3.914+01	9.053-05	7.593-01	2.466-02	3.836+01

Z= 94 PLUTONIUM

ENERGY KEV	TOTAL	COH SCATT.	INCOH. SCATT.	PHOTO EFFECT	PAIR PROD.
1	2.763+06	5.640+03	8.666-01	2.757+06	
1.5	1.293+06	5.409+03	1.938+00	1.288+06	
2	7.737+05	5.156+03	3.090+00	7.685+05	
3	3.636+05	4.642+03	5.811+00	3.590+05	
4	5.203+05	4.156+03	8.711+00	5.162+05	
5	3.918+05	3.724+03	1.098+01	3.881+05	
6	2.993+05	3.352+03	1.285+01	2.960+05	
8	1.420+05	2.757+03	1.572+01	1.392+05	
10	7.998+04	2.307+03	1.730+01	7.756+04	
15	2.838+04	1.572+03	2.110+01	2.679+04	
20	2.987+04	1.136+03	2.480+01	2.871+04	
30	1.741+04	6.682+02	3.029+01	1.671+04	
40	8.369+03	4.354+02	3.415+01	7.900+03	
50	4.716+03	3.035+02	3.631+01	4.376+03	
60	2.944+03	2.227+02	3.750+01	2.684+03	
80	1.399+03	1.326+02	3.852+01	1.228+03	
100	7.898+02	8.819+01	3.862+01	6.630+02	
150	1.079+03	4.100+01	3.778+01	1.000+03	
200	5.342+02	2.347+01	3.580+01	4.749+02	
300	2.131+02	1.056+01	3.114+01	1.714+02	
400	1.206+02	5.957+00	2.911+01	8.554+01	
500	8.149+01	3.815+00	2.683+01	5.085+01	
600	6.125+01	2.645+00	2.490+01	3.370+01	
800	4.097+01	1.484+00	2.137+01	1.812+01	
1000	3.226+01	9.440-01	1.982+01	1.149+01	
1500	2.283+01	4.253-01	1.617+01	5.424+00	8.111-01
2000	1.963+01	2.409-01	1.382+01	3.185+00	2.395+00
3000	1.799+01	1.078-01	1.088+01	1.659+00	5.341+00
4000	1.791+01	6.087-02	9.088+00	1.092+00	7.668+00
5000	1.824+01	3.904-02	7.841+00	7.898-01	9.573+00
6000	1.848+01	2.715-02	6.931+00	6.241-01	1.089+01
8000	1.948+01	1.530-02	5.670+00	4.304-01	1.336+01
10000	2.082+01	9.803-03	4.828+00	3.226-01	1.566+01
15000	2.348+01	4.363-03	3.572+00	2.071-01	1.970+01
20000	2.620+01	2.456-03	2.865+00	1.512-01	2.318+01
30000	3.020+01	1.092-03	2.084+00	9.706-02	2.802+01
40000	3.275+01	6.153-04	1.654+00	7.087-02	3.102+01
50000	3.501+01	3.939-04	1.380+00	5.553-02	3.358+01
60000	3.634+01	2.724-04	1.188+00	4.549-02	3.511+01
80000	3.863+01	1.514-04	9.361-01	3.321-02	3.766+01
100000	4.057+01	9.556-05	7.767-01	2.602-02	3.977+01

FIGURE CAPTION

Fig. 1. Elements and grid energies (see Table I) for which the Biggs-Lighthill total cross section is at least 3% less (-) or 3% greater (+) than the corresponding ENDF/B total cross section entry.


|±Δ%| ≥ 3%
BIGGS - LIGHTHILL
(SCAT. REV.)
VS. ENDF/B
ATOMIC NUMBER, Z
100
80
60
40
20
0
10^0
10^1
10^2
10^3
10^4
10^5
PHOTON ENERGY, keV

ORM NBS-114A (1-71)

U.S. DEPT. OF COMM.
BIBLIOGRAPHIC DATA
SHEET

1. PUBLICATION OR REPORT NO.
NBSIR 73-241

2. Gov't Accession No.

3. Recipient's Accession No.

4. TITLE AND SUBTITLE

Comparison of Photon Interaction Cross Section Data Sets.
VII. Biggs-Lighthill (Rev.) and ENDF/B.*

5. Publication Date

6. Performing Organization Code

7. AUTHOR(S)

8. Performing Organization
NBSIR 73-241

9. PERFORMING ORGANIZATION NAME AND ADDRESS

NATIONAL BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE
WASHINGTON, D.C. 20234

10. Project/Task/Work Unit No.
2400432

11. Contract/Grant No.
DNA-EO-72-804
Subtask No. PC-100-05

12. Sponsoring Organization Name and Address

Defense Nuclear Agency, Washington, D.C. 20305. (Support was also received from NBS Office of Standard Reference Data).

13. Type of Report & Period Covered
Interim report for
period Apr.-June 1973

14. Sponsoring Agency Code

15. SUPPLEMENTARY NOTES

16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)

The Biggs and Lighthill photon cross section data set (0.01 keV to > 10 GeV, Z = 1 to 100), previously compared in this report series with the ENDF/B data set (1 keV to 100 MeV, 87 elements with Z = 1 to 94), has since been revised to provide explicit coherent and incoherent scattering cross sections, rather than the more approximate free-electron (Klein-Nishina) scattering cross section. In this report we present a comparison of this revised set with the ENDF/B set, again in the form of percent differences between the two data sets. These differences for total, coherent scattering, incoherent scattering, photoelectric absorption and pair production cross sections are tabulated for 87 elements with Z = 1 - 83, 86, 90, 92 and 94 at 41 energies between 1 keV and 100 MeV. Coherent scattering differences below a few hundred keV are typically 1 - 5% and at higher energies are typically 10 - 30% for low Z and 2 - 10% for high Z. The incoherent scattering differences are generally less than 1% above 10 keV and typically 5 - 30% at 1 keV. These differences are primarily in regions of negligible scattering contribution to the total cross section, for which the differences are dominated by differences in the photoelectric absorption. The resulting differences in the total cross section are typically 1 - 5% except near 1 keV where differences are as high as 26% for Z = 68 and 69. In addition to the table of percent differences we include tables of the cross section values in barns/atom for these two sets, since they have not been generally available in this form.

17. KEY WORDS (Alphabetical order, separated by semicolons)

Attenuation coefficients; comparison; cross sections; photoeffect; photons; x-rays

18. AVAILABILITY STATEMENT

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19. SECURITY CLASS (THIS REPORT)
X
UNCLASSIFIED

20. SECURITY CLASS (THIS PAGE)
UNCLASSIFIED

21. NO. OF PAGES
90

22. Price

USCOMM-DC 66244-P71